

Title

Primary sensitization versus co-sensitization to hydrolyzed wheat protein

Authors: Morten J. Christensen, Carsten Bindsvlev-Jensen, Charlotte G. Mortz

From Department of Dermatology and Allergy Centre, Odense Research Center for Anaphylaxis (ORCA), Odense University Hospital, 5000 Odense C, Denmark

Aims

Wheat protein is responsible for various phenotypes of allergic diseases. More recently an increased number of immediate type 1 allergic reactions to hydrolyzed wheat proteins (HWP) have been reported.

The aim of this study was to characterize the clinical profile and evaluate patients with a case-history of anaphylaxis related to ingestion of a product containing HWP. Furthermore, to describe patients with other types of wheat allergy co-sensitized for HWP.

Methods

From May 2010 to August 2015 we investigated 56 patients (31 female, 25 male, mean age 39.0 years [1.5 – 77.2]) sensitized to commercialized HWP, either by specific immunoglobulin E (sIgE) (ThermoFischer, Uppsala, Sweden) and/or skin prick test (SPT). Based upon case-history patients were divided into 3 groups:

- (1) Allergic reaction to ingestion of a HWP containing product (n=9)
- (2) Ingestion of a wheat product; WIA (n=19),
- (3) Ingestion of a wheat product in combination with exercise; WDEIA (n=28).

All patients were orally challenged with the incriminated food and group 3 in combination with exercise.

Results

The total positive rate of sIgE to HWP was 47/56 (83.9%), SPT 35/42 (83.3%) and BHR 22/42 (52.3%). Fourteen patients were triple positive to commercialized HWP of whom 7/9 patients in the HWP group.

In total 9 (16%) patients were identified with a case-history of anaphylaxis related to a HWP containing product. Seven of 9 had a case-history to the same hydrolyzed wheat product (AMO Letbagt®).

The average serum level of HWP-sIgE and the SPT were higher in patients with a case-history of HWP, respectively (median 5.3 kU/L \pm 6.8)($p < 0.05$) and (median 6.0 mm \pm 4.1)($p < 0.05$) compared to the WIA and WDEIA groups. A complete negative pattern was determined with specific wheat proteins normally associated with other phenotypes of wheat allergy, omega-5 gliadin (f416), gliadin (f98), High Molecular Weight (Tri a 26) and α -amylase trypsin inhibitor (Tri a 30).

Basophil histamine release (BHR) for HWP was extremely positive in 8/9 HWP patients with activity retained to dilutions up to 10-12.

Conclusion

Reactivity to HWP seems to be confined to patients specifically sensitized to this heterogeneous group of products without concomitant allergy to normal wheat and with an ultrahigh sensitivity of BHR. It is, however, interesting, that the HWP patient tolerates ingestion of unmodified wheat. Irrelevant co-sensitization is also seen in classical wheat allergy.