Letter to the Editor

Temporary wheat allergy in the postpartum period

Dear Editor,

Pregnancy causes profound changes in various organ systems. In order to prevent rejection of the developing fetus, significant immunologic adaptations occur within the mother.1 It has been reported that the immune system involving IgE and Th2 undergoes various changes in the mother during pregnancy and postpartum period. A cohort study based on questionnaires filled out by mothers after childbirth on the Isle of Wight, United Kingdom, found adverse reactions to food in as many as 20% of 969 pregnant women.2 On the other hand, it is well known that food sensitivity after childbirth in many cases disappears within a few months.3 Nevertheless, precise information concerning type I food allergy in pregnant women, especially about its time course in the postpartum period remain scant. We here report a case of type I allergy specific to gliadin and water-soluble wheat albumin (WSWA) developed and disappeared in a period of the postpartum.

A thirty-one-year old female without prior food allergies presented with sudden-onset of repetitive urticaria, abdominal pain and diarrhea, since one month after the first pregnancy. The symptoms developed in winter. These symptoms always appeared after eating wheat-containing foods such as bread and noodles, but never appeared following foods free of wheat. The symptoms appeared 10–15 min after wheat ingestion and lasted 6–8 h. They were not related to exercise or her physical condition. One month after the onset of the symptoms, the titer of serum allergen-specific IgE to gluten was positive (2.37 UA/mL) and that both wheat and ω5-gliadin were negative (<0.27 UA/mL) in ImmunoCAP® assay (Thermo Fisher Scientific, Tokyo, Japan). Her doctor recommended that she avoid wheat. Two months after the onset of the symptoms, she visited our department. Skin prick tests to wheat and bread extracts (Torii Pharmaceutical, Tokyo, Japan) were negative. Western blotting analysis detected specific IgE to gliadin-mix, WSWA and water-soluble wheat globulin (WSWG) but not to glutenin-mix and ω5-gliadins (Fig. 1). Histamine release tests (HRTs) of basophils against wheat allergens showed positive reactions to gliadin-mix and WSWA, and negative to glutenin-mix, ω5-gliadins and WSWG (Fig. 2). Materials and methods regarding Western blotting analysis and HRTs are shown in the Supplementary Methods. For the following 5 months, she took oral antihistamines only when allergic symptoms occurred. During this course, she realized that she was able to eat normal amount of

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**Fig. 1.** Western blotting analysis with serum of the patient or a healthy control diluted by buffer at 1:100 and detected by horse radish peroxidase (HRP)-conjugated goat anti-human IgE. The denatured wheat antigens (gliadin-mix, glutenin-mix, ω5-gliadin water-soluble wheat albumin (WSWA) and water-soluble wheat globulin (WSWG)) were loaded at 10 µg/lane.

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meals containing wheat. Five months later, about a half year after the onset of wheat allergy, both the titer of serum antigen-specific IgE to gluten in ImmunoCAP® assay (0.11 UA/mL) and HRTs to gliadin-mix and WSWA (Fig. 2) turned negative. Western blotting analysis showed that the specific IgE to gliadin-mix and WSWA had significantly reduced, but remained unchanged to WSWG (Fig. 1). Based on the actual clinical course and the results of HRTs, we concluded that she had developed allergy to gliadin-mix and WSWA and non-biologically active IgE against WSWG, but her allergy resolved spontaneously in the course of postpartum.

The development of food allergy is largely affected by both genetic background and the post-natal condition of individuals, such as atopic diathesis and epithelial barrier dysfunction. In this case, she had a history of allergy to egg white during infancy but had never suffered from atopic dermatitis, asthma or pollinosis. Titers of serum antigen-specific IgE to tree pollens; cedar, cypress and alder, and grass pollens; timothy grass and orchard grass were all negative (<0.27 UA/mL) in ImmunoCAP® assay. After childbirth, she developed dry skin, but did not notice any allergic symptoms other than wheat allergy. In Japan, wheat allergy due to sensitization was not known, the immune balance may have already been leaning toward Th2 during pregnancy and recovered after delivery. Thus, her physical condition of postpartum was likely to hydrolyzed wheat protein in facial soap became a social problem around 2010. However, she had never used such soap, and had not increased the exposure to or the intake of wheat before and after the childbirth. Thus, her physical condition of postpartum was likely crucially involved in the development and remission of wheat allergy.

The mechanism concerning the sudden appearance of the symptoms of wheat allergy and rapid decrease of the specific IgE in postpartum period remains to be resolved. Since the values of the specific IgE to the wheat component during pregnancy in our case are not known, the immune balance may have already been leaning toward Th2 during pregnancy and recovered after delivery. However, it is reported that total IgE levels tend to increase at both one month and one year postpartum compared to intrapartum levels, whereas antigen-specific IgE values tend to decrease at the same time points. Notably, the amount of specific IgE to gliadin-mix and WSWA decreased within several months, but non-biologically active IgE against WSWG remained unchanged in our case. Recently, a case of wheat-dependent exercise-induced anaphylaxis that developed after childbirth with positive sensitization of IgE to α-gluten for more than four years was reported. Therefore, not all food allergies or IgE developing in the postpartum period are temporary. However, our case demonstrated that food allergies in postpartum may be transient and resolved spontaneously. It is feasible that many cases of postpartum food allergies may resolve without being noticeable and/or medical examination. The accumulation of cases of allergies developed in the postpartum period and in-depth investigation are expected to provide appropriate guidance for women who are pregnant or in the postpartum period.

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We have obtained informed consent from the patient to report her clinical and laboratory data.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jait.2020.05.005.

Conflict of interest

The authors have no conflict of interest to declare.

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References


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