

Immediate systemic allergic reaction in an infant to fish allergen ingested through breast milk

Takayasu Arima, Eduardo Campos-Alberto, Hiraku Funakoshi, Yuzaburo Inoue, Minako Tomiita, Yoichi Kohno, and Naoki Shimojo*

Department of Pediatrics, Chiba University Graduate School of Medicine, Chiba 260-8670, Japan

This is a rare case report of systemic allergic reaction to fish allergen ingested through breast milk. Mother ate raw fish more than 3 times a week. Her consumption of fish was associated with urticaria and wheeze in an infant via breast-feeding. Fish-specific IgE antibodies were detected by skin prick test but not by *in vitro* IgE test. This case demonstrates that fish protein ingested by mother can cause an immediate systemic allergic reaction in offspring through breast-feeding. Although fish intake is generally recommended for prevention of allergy, one should be aware that frequent intake of fish by a lactating mother may sensitize the baby and induce an allergic reaction through breast-feeding.

Key words: Allergy; Fishes; Allergens; Breast-feeding; Immunoglobulin E

INTRODUCTION

It is well recognized that foods in breast milk elicit eczema in breast-fed infants and this might be IgE mediated reactions to intact food proteins transmitted via breast milk [1]. However, there have been few reports of immediate systemic allergic reaction in breast-fed infants. Monti et al. [2] described an anaphylactic reaction due to fish hypersensitivity in an exclusively breast-fed infant. Lifschitz et al. [3] reported an anaphylactic shock to cow's milk protein hypersensitivity in a breast-fed infant. Wilson et al. [4] also reported a severe cow's milk induced colitis in an exclusive breast-fed neonate.

There have also been allergic reactions to peanut and egg in exclusively breast-fed infants [5, 6]. Here we report a rare case of a 5-month-old infant who presented systemic IgE-mediated allergic reaction to fish allergen via breast-feeding.

CASE REPORT

A 5-month-old, exclusively breast-fed boy was referred for presence of 4 tarry stools to the Department of Pediatric Surgery at Chiba University Hospital. Meckel's diverticulum scintigraphy and upper and lower gastrointestinal endoscopy

Correspondence: Naoki Shimojo
Department of Pediatrics, Graduate School of Medicine Chiba University, Inohana 1-8-1, Chiba, Japan
Tel: +81-43-226-2144
Fax: +81-43-226-2145
E-mail: shimojo@faculty.chiba-u.ac.jp

This is an Open Access article distributed under the terms of the Creative Commons Attribution. Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

Received: June 28, 2016
Accepted: October 1, 2016

Copyright © 2016. Asia Pacific Association of Allergy, Asthma and Clinical Immunology.

was negative and symptoms were improved within 24 hours by fasting. The patient developed atopic dermatitis from 2 months of age and since then the mother started to avoid the intake of egg and milk although the relation between mother's intake of egg and cow's milk and baby's dermatitis was not clear. On the third day of hospitalization breastfeeding was restarted and the baby developed cough and wheezing on that night. The patient was transferred to the Department of Pediatrics. Symptoms improved by using beta2 agonist inhalation and intravenous administration of prednisolone. Fasting was indicated again and symptoms disappeared. Breast-feeding was restarted again at 5th day after hospitalization. On the third day from resuming breast milk ingestion, urticaria occurred in about 1 hour after suckling. Urticaria appeared in 3 consecutive days thereafter. It was found that mother had consumed fish (tuna, mackerel, and Spanish mackerel) before breast-feeding. Detailed inquiry about dietary habit of the mother revealed that mother ate raw fish at least 3 times per week during pregnancy and lactation. Since it was suspected an immediate systemic response caused by fish allergen via breast milk, fish ingestion by mother was restricted. Urticaria was not observed again. After discharge, mother was instructed to avoid fish consumption, but in approximately one month later, mother accidentally ingested fish again and urticaria relapsed in infant after breast-feeding.

The infant's serum IgE was 74 IU/mL and ImmunoCap (Phadia AB, Uppsala, Sweden) was positive only to egg white (1.54 U_A/mL) and negative to milk, soy, wheat, salmon, mackerel, sardines, tuna and cod. Skin prick test (SPT) showed a positive to salmon, mackerel, sardine and tuna (Fig. 1). Although fecal eosinophils at

the time of admission were weakly positive, a marked increase of eosinophils in stool was observed when urticaria appeared after suckling.

DISCUSSION

This report shows a rare case of systemic IgE-mediated allergic reaction to fish allergen via breast milk in an exclusive breast-fed infant.

Monti et al. [2] suggested the sensitization occurred more likely during pregnancy, as the mother ingested fish during this period, but not in the 4 months prior to the episode; however, in our case, we suspect the patient was sensitized to fish allergen in the breast milk through skin since the baby suffered from atopic dermatitis from 2 months of age. We did not measure amount of fish allergen in breast milk but it may be high enough to evoke systemic reaction in the baby because mother took raw fish quite frequently. Amount of food allergen in the breast milk may be important for elicitation of IgE-mediated reaction compared to that for sensitization. In the case reported by Wilson et al. [4] the nursing mother had been drinking 4–5 glasses of cow's milk per day since delivery. It is also interesting to note that fish-specific IgE was demonstrated only by SPT but not by ImmunoCap. Schoos et al. [7] reported disagreement between SPT and serum specific IgE test (ImmunoCap) occurs frequently in infants. Thus, IgE measurement by both SPT and *in vitro* IgE are necessary to identify specific IgE antibodies especially infants suspected of food allergy.

Breast-feeding is encouraged since it provides optimal nutrition, protects against infections, enhances mother-infant bonding, and may improve cognitive functions of the offspring [8]. The protective effect of fish intake during pregnancy on the risk of atopy-related outcomes was suggested in a previous report [9]. A recent systematic review also suggested maternal consumption of fish is associated with lower risk for allergic diseases in their children [10]. Our case report calls attention to a possible systemic allergic reaction to fish allergen through breast milk in an exclusive breast-fed infant.

REFERENCES

1. de Boissieu D, Matarazzo P, Rocchiccioli F, Dupont C. Multiple food allergy: a possible diagnosis in breastfed infants. *Acta Paediatr*



Fig. 1. Positive skin prick test to fish allergens.

Allergy in an infant to fish through breast milk

1997;86:1042-6.

2. Monti G, Marinaro L, Libanore V, Peltran A, Muratore MC, Silvestro L. Anaphylaxis due to fish hypersensitivity in an exclusively breastfed infant. *Acta Paediatr* 2006;95:1514-5.
3. Lifschitz CH, Hawkins HK, Guerra C, Byrd N. Anaphylactic shock due to cow's milk protein hypersensitivity in a breast-fed infant. *J Pediatr Gastroenterol Nutr* 1988;7:141-4.
4. Wilson NW, Self TW, Hamburger RN. Severe cow's milk induced colitis in an exclusively breast-fed neonate. Case report and clinical review of cow's milk allergy. *Clin Pediatr (Phila)* 1990;29:77-80.
5. Des Roches A, Paradis L, Singer S, Seidman E. An allergic reaction to peanut in an exclusively breastfed infant. *Allergy* 2005;60:266-7.
6. Warner JO. Food allergy in fully breast-fed infants. *Clin Allergy* 1980;10:133-6.
7. Schoos AM, Chawes BL, Følsgaard NV, Samandari N, Bønnelykke K, Bisgaard H. Disagreement between skin prick test and specific IgE in young children. *Allergy* 2015;70:41-8.
8. Goldman AS. The immune system of human milk: antimicrobial, antiinflammatory and immunomodulating properties. *Pediatr Infect Dis J* 1993;12:664-71.
9. Romieu I, Torrent M, Garcia-Esteban R, Ferrer C, Ribas-Fitó N, Antó JM, Sunyer J. Maternal fish intake during pregnancy and atopy and asthma in infancy. *Clin Exp Allergy* 2007;37:518-25.
10. Netting MJ, Middleton PF, Makrides M. Does maternal diet during pregnancy and lactation affect outcomes in offspring? A systematic review of food-based approaches. *Nutrition* 2014;30:1225-41.