

CORRESPONDENCE

Iatrogenic Kwashiorkor in three infants on a diet of rice beverages

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Editor,

Roche et al. in a recent article on your journal (1) report that in infants with diagnosed cow's milk allergy (CMA), the hydrolyzed rice protein formulas (HRPF) are tolerated by more than 90% of all patients and they could provide an adequate and safe alternative to hydrolyzed infant formulas for these infants (1), because they have better taste and palatability and are also nutritionally adequate as demonstrated by the normal growth parameters when they took these formulas (1–3).

Despite the recommendations to use hydrolyzed infant formulas or HRPF, the deliberate placement of children on rice beverages by the parents could expose to protein-deficient diet with severe nutritional complications. We report three cases of severe protein malnutrition occurred in the last 2 years.

The first case was a 4-month-old girl with a history of chronic atopic dermatitis and vomiting. This child was exclusively breastfed until 2 months of age. After weaning, hydrolyzed infant formulas were started, followed by a HRPF, both refused by the child. Thus, the parents began a rice milk beverage, 1 month before the admission at our Unit.

The second case was a 4-month-old girl, who developed vomiting when he was 1.5 months old and received an infant formula. A HRPF was therefore started, rapidly replaced (2.5 months before the admission) by a rice beverage because of social problems that impeded to parents to buy the HRPF.

The third case was a 5-month-old boy with atopic dermatitis and diarrhea since 2 months of life, when he received an infant formula. Hydrolyzed milk was therefore started, followed by a HRPF, both refused by the child. Thus, she was given a rice milk beverage by parental choice, 2 months before she was admitted at our Unit.

At admission, physical examination of all patients showed a whole body edema. A laboratory examination revealed an albumin <2 g/dl (reference values 3.5–5.5 g/dl) and total protein <4 g/dl (reference value 4.6–7 g/dl). Urinalysis was negative for proteinuria. Evaluations for other causes of hypoalbuminemia, including sweet test and detections for infectious diseases, were negative.

The clinical history clearly showed that the diets of the three infants consisted almost entirely of rice beverages lasted from 1 to 2.5 months before admission. All patients received intravenous albumin. A protein hydrolyzed formula feeding

was started in all the patients; after 15 days, we performed an open challenge by cow's milk protein that confirmed the milk allergy only in two of them.

The rice beverages used in our patients contain only 0.07 g of protein/100 kcal compared to the 1.8 g/100 kcal typically found in traditional infant formulas. It is recommended that protein contents of milk formulas, including standard infant formulas and hydrolyzed formulas, should be at least between 1.8 and 2.0 g/100 kcal and it should not exceed 3 g/100 kcal. The energy density of infant formulas should be in the range of 60–70 kcal/100 ml. All the hydrolyzed formulas, including HRPF, have protein content and energy density according to these indications (4), while the protein content of rice beverages is very low. Energy density was instead almost similar with 61 kcal/100 ml (rice beverages) and 66 kcal/100 ml (hydrolyzed formulas). Rice beverages have a very low protein/energy ratio, potentially leading to iatrogenic Kwashiorkor, if they are used as exclusive feeding as in the three cases reported. Kwashiorkor continues to be reported in infants in developed countries as consequence of protein-poor diets (5–9). The largest case series reported in the literature from Liu et al. described a cohort of 12 infants presenting with Kwashiorkor; in half of these 12 cases, the malnutrition was the result of a deliberate placement of children on a protein-deficient diet by the parents (10).

In conclusion, extensively hydrolyzed formulae are the first choice in patients with CMA; where available, rice-based hydrolyzed can adequately substitute extensively hydrolyzed cow's milk proteins (11). Pediatricians should appropriately warn parents about the dangers of using diet with low protein intake, such as rice beverages, as infant nourishment and clearly indicate the hydrolyzed formulas, with adequate protein contents, in children with confirmed diagnosis of CMA.

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References

1. Reche M, Pascual C, Fiandor A, et al. The effect of a partially hydrolysed formula based on rice protein in the treatment of infants with cow's milk protein allergy. *Pediatr Allergy Immunol* 2010; **21**: 577–85.
2. Fiocchi A, Travaini M, D'auria E, Banderali G, Bernardo L, Riva E. Tolerance to a rice hydrolysate formula in children allergic to cow's milk and soy. *Clin Exp Allergy* 2003; **33**: 1576–80.
3. Agostoni C, Fiocchi A, Riva E, et al. Growth of infants with IgE-mediated cow's milk allergy fed different formulas in the complementary feeding period. *Pediatr Allergy Immunol* 2007; **18**: 599–606.
4. Koletzko B, Baker S, Cleghorn G, et al. Medical position paper global standard for the composition of infant formula: recommendations of an ESPGHAN coordinated international expert group. *J Pediatr Gastroenterol Nutr* 2005; **41**: 584–99.
5. Tierney EP, Sage RJ, Shwayder T. Kwashiorkor from a severe dietary restriction in an 8-month infant in suburban Detroit, Michigan: case report and review of the literature. *Int J Dermatol* 2010; **49**: 500–6.
6. Katz KA, Mahlberg MH, Honig PJ, Yan AC. Rice nightmare: Kwashiorkor in 2 Philadelphia-area infants fed rice dream beverage. *J Am Acad Dermatol* 2005; **52**: S69–72.
7. Massa G, Vanoppen A, Gillis P, Aerssens P, Alliet P, Raes M. Protein malnutrition due to replacement of milk by rice drink. *Eur J Pediatr* 2001; **160**: 382–4.
8. Novembre E, Leo G, Cianferoni A, Bernardini R, Pucci N, Vierucci A. Severe hypoproteinemia in infant with AD. *Allergy* 2003; **58**: 88–9.
9. Carvalho NF, Kenney RD, Carrington PH, Hall DE. Severe nutritional deficiencies in toddlers resulting from health food milk alternatives. *Pediatrics* 2001; **107**: E46.
10. Liu T, Howard RM, Mancini AJ, et al. Kwashiorkor in the United States: fad diets, perceived and true milk allergy and nutritional ignorance. *Arch Dermatol* 2001; **137**: 630–6.
11. Fiocchi A, Schünemann HJ, Brozek J, et al. Diagnosis and rationale for action against cow's milk allergy (DRACMA): a summary report. *J Allergy Clin Immunol* 2010; **126**: 1119–28.