Medical Position Statement

Antireflux or Antiregurgitation Milk Products for Infants and Young Children: A Commentary by the ESPGHAN Committee on Nutrition

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In several European countries, antireflux or antiregurgitation milk products are available for infants and young children. These products are promoted with the claim that they benefit infants who burp or spit up, or who have gastroesophageal reflux. These milk products are thickened with starch, guar gum, or carob bean gum. In some products, the protein and lipid contents have been modified from that in infant formulas. As a result, antireflux or antiregurgitation milk products for infants usually do not meet the European Union’s compositional standards for infant formula (1). Although they are usually sold as foods for special medical purposes (2), product presentation and marketing are similar to that of infant formulas, and in some countries, they are sold in retail stores. In this article, the Committee reviews concerns related to the widespread use of such thickened milk products.

REGURGITATION AND GASTROESOPHAGEAL REFLUX

Burping up air during and after feeding is a physiologic and desirable process that releases the gas swallowed during feeding, and it can help to decrease postprandial milk regurgitation. Therefore, infants usually do not require dietary or other therapeutic interventions.

Similarly, mild to moderate regurgitation (spitting up and possetting) during or after infant feedings is a common finding, usually the consequence of primary gastroesophageal reflux and a transient, physiologic, and harmless phenomenon (3). Unlike in older children and adults, in infancy even a small reflux can induce the infant to spit up milk because of the limited size of the esophagus. As the infant grows and as the esophagus lengthens and the gastroesophageal sphincter mechanisms develop, the frequency and relative amount of gastroesophageal reflux decreases. In the absence of other symptoms or pathologic findings, mild to moderate regurgitation in infants does not require diagnostic workup or dietary or other therapeutic interventions (4).

Only in some infants is regular spitting up or possetting a symptom of pathologic gastroesophageal reflux disease, in which acid-induced lesions of the esophagus and esophagitis may develop and cause symptoms, such as pain, feeding difficulties, failure to thrive, or pulmonary aspiration. If pathologic gastroesophageal reflux disease is suspected, specific diagnostic measures are required to estimate the severity of the problem, to detect reflux secondary to other disorders, and to determine appropriate therapeutic measures including drug therapy (3,4).

In contrast, the many infants with frequent regurgitation, but no indication of complications, usually require only counseling of the caregivers, without further diagnostic or therapeutic measures. In these infants, frequent small feeds and postprandial burping may help to reduce spitting up (3,4).

THICKENING MILK-BASED DIETS AND USING CASEIN-BASED MILKS

Traditionally, the milk diet of infants who spit up frequently has been thickened with starches or nondigestible carbohydrates. A controlled trial that evaluated use...
of formula thickened with 4% rice starch in infants with gastroesophageal reflux showed decreased regurgitation and crying, and increased sleep time, even though the number of reflux episodes documented by scintigraphy did not decrease (5). Another interpretation of this study is that the large increase in dietary energy density and an increased dietary osmolarity caused the change in infant behavior, resulting in sedation. However, esophageal pH monitoring showed that milk thickened with rice starch or carob bean gum decreased the number of acid reflux episodes, but the total duration of acid exposure remained unchanged, presumably because of slower clearance of the thickened acid refluxate from the esophagus (6,7). In this context, an increased incidence of coughing while receiving a thickened milk diet has been attributed to decreased acid reflux clearance (8). A benefit of thickened milk diets in infants who spit up frequently is decreased regurgitation and consequently decreased nutrient losses, which can be advantageous for infants who fail to thrive in this situation (7,9,10). However, the limited literature does not support a benefit of using thickened milk diets.

Some antiregurgitation products also include casein as the protein source, based on the hypothesis that gastric precipitation of casein would decrease regurgitation, as compared to a casein/whey protein mixture. However, no beneficial effect of casein use for regurgitation in infants has been documented.

NUTRITIONAL EFFECTS AND SAFETY OF THICKENING AGENTS

In adults, thickening foods has delayed gastric emptying and gastrointestinal transit (11–13). In infants, carob bean gum (locust bean gum, E410) induced frequent, loose, gelatinous stools (14). Studies of various thickening agents, including guar gum, carob bean gum, and soybean polysaccharides, indicate the potential for decreased intestinal absorption of carbohydrates, fats, calcium, iron, zinc, and copper; alterations in metabolic utilization of dietary substrates; and alterations of mucosal and endocrine responses (15–20). One study using an in vitro model suggested that bioavailability of calcium, iron, and zinc in infant formula may be decreased by thickening formula with nondigestible carbohydrates, but not by thickening with added starch (21). In some, but not all, animal studies, adding carob bean gum to the diet decreased growth (22,23). However, no conclusive information is available on the potential effects of thickening agents on the bioavailability of dietary nutrients and growth in infants (24).

Allergic reactions to carob bean gum have been reported in adults exposed to it at their workplaces (25–27) and in infants after exposure to “antireflux milk” thickened with carob bean gum (28).

In view of the limited information, the European Commission Scientific Committee on Food concluded it was “not persuaded that it is necessary to give thickened infant formula to infants in good health” (29).

CONCLUSIONS

Although thickening foods for infants with recurrent regurgitation caused by severe gastroesophageal reflux has been practiced for a long time and was recommended in recent consensus reports (3,4), evidence on the effects of thickened diets in infancy is limited. Thickening agents can potentially decrease the amount of visible regurgitation and associated losses of energy and nutrients, but no evidence suggests benefit with respect to acid exposure of the esophageal mucosa or with respect to bronchopulmonary complications of gastroesophageal reflux.

The effects of thickening agents in infant feeds on the bioavailability of nutrients; on mucosal, metabolic, and endocrine responses; and on infant growth have not been clarified sufficiently. The frequency of allergic reactions to various thickening agents in infancy also is unknown.

In view of the limited information available, the Committee recommends that thickening agents and infant diets containing thickening agents should not be used indiscriminately in healthy, thriving infants who spit up. Until better information is available, thickening agents and infant diets containing thickening agents should be used only in selected infants with failure to thrive caused by excessive nutrient losses associated with regurgitation, and used only in conjunction with appropriate medical treatment and supervision. The current practice of indiscriminately offering thickened infant diets to the general public in retail stores, with claims that these products benefit infant who spit up, results in their frequent overuse and misuse, and should be discontinued.

REFERENCES

7. Vandenplas Y, Sacre L. Milk-thickening agents as a treatment for


