Nutrition 29 (2013) 184–194

Contents lists available at ScienceDirect

Nutrition

journal homepage: www.nutritionjrnl.com

Applied nutritional investigation

Practical algorithms for managing common gastrointestinal symptoms in infants

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ARTICLE INFO

Article history:
Received 28 June 2012
Accepted 3 August 2012

Keywords:
Constipation
Colic
Crying
Functional disorder
Formula
Fussiness
Gastrointestinal symptoms
Gassiness
Infant
Regurgitation

ABSTRACT

Objective: In early infancy, various gastrointestinal symptoms (e.g., constipation, regurgitation, crying/fussiness, infantile colic, and excessive gas) are common problems and may result in numerous visits to pediatricians. Worldwide, this often results in switching infant formulas because parents (and sometimes doctors) believe these symptoms reflect a formula intolerance. However, in many cases, these infants are growing and developing normally. This study was performed to offer family pediatricians consensus-based algorithms on the management of the most common gastrointestinal symptoms in infants.
Methods: A group of pediatric gastroenterologists and pediatric allergists from Europe, USA, Latin America, and Asia developed guidelines and practical algorithms to assist general pediatricians in addressing this challenge.
Results: Five such practice recommendations were developed after a thorough literature review. These algorithms should not be considered as an "evidence-based guideline"; on the contrary, the authors are convinced that challenging these proposals will result in updated and improved versions.
Conclusion: To date, these algorithms, based on the published literature, are the result of a broad consensus of pediatric gastroenterologists from different continents.

Introduction

Functional gastrointestinal (GI) symptoms are very frequent in infants [1]. In formula-fed infants, general practitioners and family pediatrics very often change the formula. The authors developed practical algorithms on the management of these functional GI symptoms. Because double-blinded, placebo-controlled, prospective intervention trials are very limited in this field, these algorithms are based on a consensus among opinion leaders from different parts of the world. Evidence is used wherever it was available. The authors met twice face to face and then by e-mail and teleconferencing. The concept was started by one of the authors (P. A.); however, there was no financial contribution or help from this author's company (Abbott Nutrition) in any aspect.

Regurgitation

Daily regurgitation has a prevalence ranging from 86.9% at 2 mo of age to 7.6% at 1 y [2]. The presence of regurgitation is related to the volume of food ingested: the larger the volume ingested, the longer the gastric emptying time, the higher the intragastric pressure, and the more frequent the transient

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http://dx.doi.org/10.1016/j.nut.2012.08.008

spontaneous relaxations of the lower esophageal sphincter, which predispose an infant to gastroesophageal reflux (GER) [3].

Diagnosis

Regurgitation is defined as the passage of refluxed contents into the pharynx or mouth or from the mouth [4]. Vomiting is defined as a central nervous system reflex involving autonomic and skeletal muscles. GER refers to the movement of gastric content retrograde and out of the stomach. GER is a physiologic process occurring several times per day in all healthy individuals. According to pH-metric criteria, most GER episodes are shorter than 3 min, occur in the postprandial period, and cause few or no symptoms [5]. According to the Rome III criteria, the diagnosis of regurgitation in a healthy infant 3 wk to 12 mo of age should include regurgitation at least two times per day for at least 3 wk and the absence of nausea, hematemesis, aspiration, apnea, failure to thrive, difficulty in feeding or swallowing, and an abnormal posture [1]. More than 50% of all infants meet these criteria (Fig. 1).

Management

The great majority of infants with regurgitation are normal. However, in the infant with recurrent regurgitation, a good medical history and a complete physical examination are mandatory to rule out red flags that can suggest a pathologic condition. One important parameter is the child's anthropometric percentiles to know whether the child is growing properly. Physiologic regurgitation should not be diagnosed in an infant with vomiting and poor weight gain [6]. The management of physiologic regurgitation includes parental education; for example, parents need to know that overfeeding exacerbates regurgitation. In infantile regurgitation, thickened anti-regurgitation (AR) formula decreases the frequency and volume of regurgitation. A prone (anti-Trendelenburg) position is not recommended because of the risk of sudden infant death syndrome [7]. In addition, studies have not shown that anti-secretory drugs or prokinetic agents are of benefit in infants with physiologic regurgitation [8]. A subset of infants with an allergy to cow's milk protein (CMP) may exhibit regurgitation and vomiting indistinguishable from that associated with physiologic GER [5]. In these infants, vomiting frequency decreases significantly (usually within 2 wk) after the elimination of CMP from the diet, and re-introduction causes the recurrence of symptoms. Studies support the use of extensively hydrolyzed or amino acid formulas (aaFs) in formula-fed infants with bothersome regurgitation and vomiting lasting up to 4 wk [5].

Most episodes of regurgitation in healthy individuals are shorter than 3 min, occur in the postprandial period, and cause few or no symptoms [9]. In contrast, GER disease (GERD) is present when the reflux of gastric contents causes troublesome symptoms and/or complications [10]. In this case, the cause of GERD should be identified. The management of GERD includes lifestyle changes, pharmacologic therapy, and, seldom, surgery. Nutritional management of GER includes thickened AR formula, which, by improving the viscosity of what is ingested, relieves regurgitation symptoms, decreases crying, improves sleep, decreases the frequency and total volume of vomiting, and improves weight gain [11]. AR formulas containing processed rice, corn, or potato starch, guar gum, or locust bean gum are available in Europe, Latin America, Asia, and the USA [5]. The effect of the thickener on the absorption of vitamins and minerals has been investigated [12] but has not been demonstrated in vivo. If a commercial AR formula is not available, thickening may be done at home with locust bean gum or rice, corn, or wheat cereal. However, if cereals are used, the caloric intake is increased (possibly causing excessive weight gain). Locust bean gum does not increase the caloric density. Also, "home thickening" of a regular formula increases the osmolarity, which in turn increases the number of lower esophageal sphincter relaxations, which may cause more reflux and regurgitation. Patients with regurgitation/vomiting and persistent failure to thrive should be referred to a pediatric specialist [8].

When red flags are present, there are a few conditions that are often found. CMP allergy (CMPA) should be suspected in an infant with recurrent regurgitation and/or vomiting associated with eczema and/or wheezing. In this case, elimination of CMP should start with an extensive hydrolysate. The guidelines define a therapeutic hypoallergenic formula as one that is tolerated by at least 90% (with 95% confidence) of infants with CMPA [13]. These criteria are met by extensively hydrolyzed formulas based on whey, casein, or another protein source and by amino acid–based formulas. They will probably also be met by (extensive) rice hydrolysates. It is best that all supplementary food is stopped during the diagnostic elimination diet. Also, a trial of a milk-free diet for the breast-feeding mother is appropriate for infants not responding to management [1]. GER and/or regurgitation are almost never an indication to stop breast-feeding.

Infantile colic

Infantile colic was first described by Wessel et al. in 1954 [14] as "crying lasting three or more hours a day, at least three days a week for at least three weeks." In 2006, the Rome III criteria defined it as "episodes of irritability, fussing, or crying that begin and end for no apparent reason and last at least three hours a day, at least three days a week, for at least one week" [1]. The incidence varies from 5% to 20% [15]. Colic occurs equally in breast- and bottle-fed infants and in both sexes [15]. The etiology is unknown and multiple hypotheses have been proposed, including altered GI function; variable food intolerance, sometimes related transient low lactase activity; CMPA; GER; intestinal microflora imbalance; etc. [16].

Diagnosis

The cardinal symptom is excessive and persistent loud crying, which mostly tends to occur late in the afternoon. During each episode, the child appears distressed, irritable, and fussy and contracts the legs, becomes red-faced, and frequently has episodes of borborygmi. In any patient with suspected infantile colic, it is necessary to consider CMPA, GER, and transient low lactase activity by searching for the patient's clinical symptoms (Fig. 2) [17].

Management

There are no uniform criteria for a specific therapeutic regimen. The first recommended step is to look for potential "red flags" (Fig. 2); if not present, evaluate the feeding technique; then, reassure the caregivers and offer general advice, emphasizing the self-limiting nature of the condition. For breast-fed infants, clinicians should advise mothers to continue breast-feeding but can sometimes recommend that the mothers avoid cow's milk from their own diet. The elimination diet should be continued for a minimum of 2 wk and should