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ORIGINAL ARTICLE

Diagnosis of Gastroesophageal Reflux and Gastroesophageal Reflux Disease: clinical and epidemiological overview of children treated at a specialized ambulatory

Bianca de Oliveira Rodrigues[1], Mariana Menezes Rocha[1], Indhira Ribeiro Almeida[1], Katia de Miranda Avena[1]

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Abstract

Objective: Verify the prevalence of gastroesophageal reflux disease (GERD) among infants diagnosed with gastroesophageal reflux (GER) treated at a pediatric gastroenterology clinic, describing the clinical-epidemiological profile of the studied population. **Methods:** This is an epidemiological, retrospective, cross-sectional study, based on the review of medical records of patients. Sociodemographic, clinical, epidemiological variables were recorded, such as age, sex, symptoms presented, type of nutrition, pediatricians prescription and medications used. **Results:** There were studied 93 children diagnosed with GERD, whose prevalence of GERD was 45.2%. In GER and GERD groups, the most prevalent clinical-epidemiological profile was of boys (58.8% and 52.4%), aged over 6 months (54.9% and 61.9%). The onset of symptoms occurred at 3.0 months (IIQ [0.0-5.0 months]) in children with GER and at 2.0 months (IIQ [0.0-3.0 months]) in those with GERD. There was a higher prevalence of regurgitation (92.2%) and irritability (33.3%) among children with GER; and regurgitation (95.2%), cough and hiccups (28.6%, each) in those with GERD. Regarding drug treatment, there was a higher prevalence of the use of acid inhibitors (66.7%). **Conclusion:** A high prevalence of GERD was demonstrated, with regurgitation, cough and hiccups as the main symptoms. Infants on exclusive breastfeeding had a lower frequency of GER and GERD. Among the most used drugs, acid inhibitors were the most prescribed.

[1] Centro Universitário UNIFTC, Curso de Medicina - Salvador - Bahia - Brasil.

Correspondence to:
Katia de Miranda Avena.
Centro Universitário UNIFTC , Praça José Bastos, 55 - Osvaldo Cruz, Itabuna - BA, 45600-080. E-mail: katiaavena@hotmail.com

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INTRODUCTION

Gastroesophageal reflux (GER) is described as the return of gastric contents to the esophagus, which can reach the pharynx, mouth and respiratory tract and cause regurgitation. This is a condition that frequently occurs during early childhood, when, despite the physiological form being more common and prevalent, pathology may develop[1].

It is a transient physiological gastrointestinal disorder, present in more than 70% of infants in the first few months, but which tends to improve spontaneously[2]. It is a disorder arising from the transit of gastric contents to the esophagus, which normally occurs after meals and may cause few or no symptoms.

GER begins with short episodes, lasting less than 3 minutes, generally in the postprandial period. Over time, these regurgitations increase in number and volume, between 2 and 4 months, and progressively decrease, becoming rarer with increasing age.

Most cases of GER resolve within the first year of life. Differently, in patients with gastroesophageal reflux disease (GERD), several other complications, in addition to regurgitation, may occur, such as hematemesis, difficulty during breastfeeding, lack of weight gain, crying, irritability and postural changes, reinforcing the importance of a careful medical approach for an appropriate treatment[1,3].

In clinical practice, it can be complex to differentiate GER from GERD in infants and children due to the difficulty in communicating with these patients and the presence of non-specific symptoms. However, clinical history and physical examination can help distinguish between these two conditions, avoiding possible complications, ruling out more worrisome disorders and unnecessary use of medications[4]. After distinguishing between these two conditions, treatment in children includes everything from simple changes in eating habits (except for exclusively breastfed infants), postural guidance to drug and surgical treatment when indicated[3].

Infants who present clinical signs of regurgitation, excessive crying and some degree of feeding difficulty may, in addition to drug therapy, be subjected to dietary treatment, which includes thickening the formula in use and dividing meals[3].

The principle of thickening the formula is intended to make it difficult for food to return to the esophagus, contributing to less exposure to gastric acid. It is important to highlight that patients on exclusive breastfeeding should not undergo this procedure[5,6].

As for diet fractionation, it is recommended to offer food in smaller quantities and more often. Normally, the period in which the complementary diet begins (6 months) coincides with the stage of digestive system maturation of these infants, which results in a significant reduction in reflux episodes and, consequently, in the symptoms associated with them in this age group[7].

Regarding pharmacological treatment, this should be reserved for patients with GERD, in whom the presence of reflux results in symptoms that compromise the individual's health, and who, therefore, deserve special care. Pharmacological treatment begins with histamine H2 receptor antagonists and proton pump inhibitors, which reduce gastric acidity as the mechanism of action. For a long time, prokinetics were used to treat GERD, but more than a decade ago it was confirmed that they were not effective[8].

Considering that GER is a frequent event in the pediatric population and that this is a constant complaint in pediatric and pediatric gastroenterology outpatient clinics, this study aims to assess the prevalence of GERD among infants diagnosed with GER treated in an outpatient pediatric gastroenterology clinic, describing the epidemiological and clinical profile of the study population.

METHODS

This is an epidemiological, retrospective, cross-sectional study, based on the review of medical records from patients diagnosed with GERD, treated at the pediatric gastroenterology outpatient clinic of a teaching facility at a private higher education institution, in the city of Salvador, Bahia, during the period from January 2014 to December 2019.

The data collection was carried out considering the presence of a diagnosis of Gastroesophageal Reflux and Gastroesophageal Reflux Disease, code K21 of the International Classification of Diseases and Related Health Problems (ICD-10). Patients with incomplete medical records were not included.

A specific form was created for data collection, recording sociodemographic, clinical and epidemiological variables, such as age, sex, symptoms presented, type of diet, pediatrician's prescription and medications used.

The data obtained were tabulated using the Microsoft Excel 2013 program. Data analysis was carried out through the Jamovi®, version 1.2 statistical software. Categorical variables were presented through the frequency distribution of the categories, represented in absolute numbers (n) and percentages (%). The numerical variable was expressed as arithmetic mean (AM) and standard deviation (SD).

The study was approved by the Research Ethics Committee, through CAAE nº 25306319.9.0000.5032 and meets the ethical aspects recommended by Resolution nº 466/12, of the National Health Council.

RESULTS

The study population consisted of 93 children diagnosed with GER, of which 54.8% (n=51) had physiological GER and 45.2% (n=42) had GERD (table 1).

There was a higher prevalence of children admitted older than 6 months, both in the total sample (n=54, 58.1%), and in those with GER (n=28, 54.9%) or GERD (n=26, 61.9%). Regarding sex, there was a higher prevalence of men in the total sample (n=52, 55.9%) and in both subgroups (GER: n=30, 58.8%; GERD: n=22, 52.4%).

In children with GER, the onset of symptoms occurred at three months of age (0.0-5.0 months), while in those with GERD it occurred earlier, at two months of age (0.0-3.0 months). In both groups, the majority of children presented more than one symptom simultaneously (GER: n=29, 56.9%; GERD: n=28, 66.7%), with a higher prevalence of regurgitation in the total sample (n=87, 93.5%), as well as in children with GER (n=47, 92.2%) or GERD (n=40, 95.2%).

Among children admitted under 6 months (41.9%), the vast majority were no longer on exclusive breastfeeding, both in the total sample (66.7%) and in the subgroups (RGE: n=14, 60, 9%; GERD: n=12, 75.0%).

Prior to the consultation with a specialist, all children with GERD were not receiving drug treatment, as opposed to all children with GERD who were on drug treatment. When analyzing the non-drug treatment prescribed, it was found that the minority of children received dietary guidance (GER: n=3, 5.9%; GERD: n=1, 2.4%) and postural instructions (GER: n=4 , 7.8%; GERD: n=4, 9.5%). After consultation with the specialist, a change in this scenario was demonstrated, with a significant increase in the prescription of dietary and postural measures in both groups (table 2).

Regarding prescribed drug treatment, 42 infants (45.2%) were using at least one medication (table 3), with a higher prevalence of acid inhibitors (n=28, 66.7%), mainly ranitidine (n=19, 67.9%). Prokinetics were used by 17 infants (40.5%), specifically domperidone. The combined use of these two classes of medications was present in 19% of prescribed drug treatments.

DISCUSSION

GER, the passage of gastric contents into the esophagus, with or without regurgitation, can lead to symptoms, discomfort and/or complications, turning pathological and receiving the name GERD[7]. The present study demonstrated a 46.2% prevalence of GERD among the children evaluated. Although the epidemiological data demonstrated in this study corroborate the available literature[9], it is possible that the high prevalence of GERD demonstrated is due to a sample made up of more severe cases as they were referred to a reference outpatient clinic.

It is important to highlight that GERD has been one of the main causes of consultation with a pediatric gastroenterologist, being a cause of great concern for parents of infants. In clinical practice, it can be difficult to differentiate GER from GERD in children, and these terms are often used interchangeably by healthcare professionals and parents[5]. Studies suggest that the more one knows about GER, the less one understands about this condition which, despite being benign in most cases, can, in a minority of cases, become complicated as GERD[9,10].

In the literature, epidemiological studies indicate that GER occurs in approximately 50% of infants under 2 months of age, 60-70% of infants aged 3-4 months and 5% of infants aged 12 months, It is known that the incidence decreases with advancing age[11,12]. In the present study, the average age at the onset of symptoms was 2 months for patients with GERD and 3 months for patients with GER, which also corroborates previous studies that support the higher prevalence among young infants[11,12]. This finding reinforces the already known immaturity of the development of the gastrointestinal tract. Younger children have a shorter abdominal esophagus, less esophageal clearance, slow gastric emptying and lower gastric compliance[10]. Furthermore, among the infants evaluated in this study, as demonstrated by other authors[10,13], there was a higher prevalence in males.

The most common symptom is regurgitation, which is present in practically all cases of GER. Regurgitation becomes worse after feeding and when the baby is in a recumbent position or when pressure is applied to the abdomen. Approximately 25% of children regurgitate four or more times a day[12]. In addition to regurgitation, infants with GERD may present irritability, intense crying, coughing, hiccups, refusal to eat, sleep disturbances and poor weight gain, and it is common for the child to often present more than one associated symptom[12]. In this study, a high prevalence of regurgitation was demonstrated in both children with GER and those with GERD. In addition to this symptom, children with GERD also had a high prevalence of coughing and hiccups. It is important to highlight that the symptoms identified in this study refer to the moment the child arrives at the specialist for consultation.

In the group of children under 6 months of age, the majority of them were receiving mixed breastfeeding or had already been weaned at the time of the consultation. This can occur due to many factors, including mothers who are unable to combine work with exclusive breastfeeding, lack of knowledge because they believe that breast milk does not meet the child's needs and, to a lesser extent, low breast milk production. This behavior may have contributed to the high rate of GERD described in this study since exclusive breastfeeding has a protective effect against this condition. Its facilitated digestibility directly

Table 1. Clinical and epidemiological profile of study participants, grouped according to the diagnosis of Gastroesophageal Reflux and Gastroesophageal Reflux Disease.

Variables	GER (n=51)	GERD (n=42)	TOTAL (n=93)
Age at admission, months (MD, IIQ)	8.0 (3.5-14.5)	7.0 (5.3-14.5)	8.0 (4.0-15.0)
Age, n (%)			
<6 months	23 (45.1)	16 (38.1)	39 (41.9)
>6 months	28 (54.9)	26 (61.9)	54 (58.1)
Sex, n (%)			
Males	30 (58.8)	22 (52.4)	52 (55.9)
Females	21 (41.2)	20 (47.6)	41 (44.1)
Age at symptoms onset, in months (MD, IIQ)	3.0 (0.0-5.0)	2,0 (0.0-3.0)	2.0 (0.0-4.0)
Having more than one symptom, n (%)	29 (56.9)	28 (66.7)	57 (61.3)
Symptoms, n (%)			
Regurgitation	47 (92.2)	40 (95.2)	87 (93.5)
Intense crying	16 (31.4)	9 (21.4)	25 (26.9)
Cough	12 (23.5)	12 (28.6)	24 (25.8)
Hiccups	12 (23.5)	12 (28.6)	24 (25.8)
Irritability	17 (33.3)	7 (16.7)	24 (25.8)
Low weight gain	9 (17.6)	8 (19.0)	17 (18.3)
Refuses feeding	6 (11.8)	7 (16.7)	13 (14.0)
Sleep disorder	6 (11.8)	1 (2.4)	7 (7.5)
TDiet type among those younger than 6 months, n (%)*			
Breastfeeding only	9 (39.1)	4 (25.0)	13 (33.3)
Artificial milk or mixed milk feeding	14 (60.9)	12 (75.0)	26 (66.7)
Prescription prior to the visit to the specialist, n (%)			
Non-drug treatment	51 (100.0)	---	51 (54.8%)
Drug treatment	---	42 (100.0)	42 (45.2%)

MD: Median; IIQ: Interquartile Range; GER: Physiological Gastroesophageal Reflux; GERD: Gastroesophageal Reflux Disease; *Total of 39 patients under 6 months of age, 23 patients in the GER group and 16 patients in the GERD group.

Table 2. Non-drug treatment prescribed before and after consultation with a specialist, considering the grouping of children regarding the diagnosis of Gastroesophageal Reflux and Gastroesophageal Reflux Disease.

Variables	GER (n=51)		DRGE (n=42)	
	Before specialist	After specialist	Before specialist	After specialist
Espessamento da Dieta, n (%)	---	20 (39.2)	---	12 (28.6)
Fracionamento da Dieta, n (%)	3 (5.9)	24 (4.,1)	1 (2.4)	16 (38,1)
Medidas Posturais, n (%)	4 (7.8)	46 (90.2)	4 (9.5)	39 (92.9)

RGE: GER: Physiological Gastroesophageal Reflux; GERD: Gastroesophageal Reflux Disease.

Table 3. Drug treatment prescribed after consultation with a specialist.

Drug treatment*	GERD
Ranitidine, n (%)	19 (45.2)
Omeprazole, n (%)	9 (21.4)
Domperidone, n (%)	17 (40.5)

* There was a child using combined medications; GERD: Gastroesophageal Reflux Disease

interferes with gastric clearance, reducing the time food remains in the stomach and, consequently, reducing the chance of it returning[12].

Regurgitation in infants without warning signs suggests the diagnosis of physiological GER. In this case, clinical monitoring is recommended, without the need for additional examination or use of medication[9,10]. In GER, the management described in the literature includes guidance for parents, with explanations about the physiological condition, support and encouragement for breastfeeding, description of positions that facilitate the occurrence of GER, clarification of doubts and guidance regarding the emergence of warning signs. Regarding the most appropriate position, parents should be advised to place their babies in dorsal or left lateral decubitus with the headboard elevated to 30 degrees[10]. Regarding diet, thickening and fractioning food may be indicated among infants without exclusive breastfeeding in order to reduce the chance of gastric volume overload and food returning to the esophagus. These guidelines can be widely recommended and can be part of the management of infants with physiological GER[10]. In this study, it was demonstrated that non-drug treatment was little explored by general practitioners, which could have contributed to referring the patient to the specialist, possibly due to the refractoriness of the cases. This is probably due to the difficulty clinical doctors have to differentiate one condition from another and indicate appropriate treatment. A fundamental issue is to distinguish between clinical manifestations of GER and GERD to identify patients who should only be monitored by a pediatrician from those who need to be referred to a specialist[9]. The present study demonstrated that, after consultation with the specialist, postural and dietary measures were widely explored in the prescription for both children with GER and GERD.

Regarding the use of medication, this approach is reserved for cases of pathological GER with the aim of treating symptoms and reducing the chances of complications. As described in the literature, in this study, the use of medication was recommended only for children with GERD. Among the most commonly used classes of medications are antacids, prokinetics and proton pump blockers. This medication class has been increasingly prescribed in the pediatric population[10]. In this study, we found out that among patients with GER, the most prescribed acid inhibitor was ranitidine, which may be associated with the lower cost of this medication in relation to proton pump inhibitors. It is important to highlight that, in 2019, the company responsible for marketing this medication suspended its manufacture due to the potential health risk that the presence of N-nitroso dimethylamine in this drug appears to pose[14].

Among prokinetics, domperidone proved to be a drug frequently prescribed by pediatricians for children with GERD, even before consultation with a specialist. However, its prescription is not supported by pediatric consensus as clinical trials with placebo have not yet demonstrated efficacy in first-line treatment in babies and children5.

In summary, the present study demonstrated a high prevalence of gastroesophageal reflux disease among the infants studied, with regurgitation being the main symptom, followed by coughing and hiccups. It was observed that the frequency of GER and GERD among infants under 6 months of age who were exclusively breastfed was significantly lower when compared to those using artificial milk. Non-drug treatment was more significant after consultation with a specialist doctor for both children with GER and GERD. Among the drugs used to treat infants with GERD, ranitidine and domperidone prevailed as the most prescribed.

This study reinforces the relevance of training pediatricians, ensuring the recognition of GER and the need to refer cases refractory to initial management to a specialist. Such conduct aims to ensure not only adequate treatment, but the rapid resolution of symptoms for the well-being of the baby and their family.

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