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Lactose intolerance in children with abdominal pain – do we relatively often take this diagnosis into account?

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Abstract: Abdominal pain in children is one of the most common reasons for consultations in general practice. Diagnostics of abdominal pain in children is particularly difficult. One of the causes of this disorder is lactose intolerance due to lactase deficiency. The aim of this study was to assess the frequency of lactose malabsorption and lactose intolerance in children with abdominal pain, as well as to investigate the time-lag between onset of symptoms and diagnosis. The study involved 170 children with abdominal pain, aged 2-18 years. Some patients suffered from other gastrointestinal symptoms, such as vomiting, nausea, abdominal distension or diarrhea. Children were divided into 2 groups. The first group comprised 121 children aged 2-7 years (mean age 3.8 ± 1.4 yrs), 60 girls and 61 boys, and the second group consisted of 49 subjects aged 8-18 years (mean age 12.9 ± 3.5 yrs), 24 girls and 25 boys. Hydrogen breath test (HBT) after oral ingestion of lactose was performed in all children. All subjects remained under observation for 24 hours. The development of adverse gastrointestinal symptoms in response to the ingestion of a given amount of lactose was monitored. The time interval from the first symptoms of lactose intolerance to diagnosis was also estimated. In the first group, positive results of HBT test confirming lactose malabsorption were observed in 16 children (13%). Clinical symptoms after oral ingestion of lactose occurred in 13 children (10.7%), 6 (26.7%) children with positive and 7 (5.7%) with negative results of this test. In the second group, the HBT results indicating lactose malabsorption were obtained in 17 children (34%). Clinical symptoms after oral lactose ingestion developed in 10 (20.4%) of the children, 6 (28%) with positive and 4 (8.1%) with negative result of the test. In the first group of children, the time-lag between the first symptoms and proper diagnosis of lactose intolerance was mean 7 ± 2 months, while in the second group it was 14 ±4 months. Among children aged 2-7 years, the frequency of lactose malabsorption and lactose intolerance were 13% and 10.7%, respectively. Among children aged 8-18 years the frequency of lactose malabsorption and lactose intolerance were 34% and 20.4%, respectively. The frequency of lactose intolerance shown by this study, as well as the relatively long period of time required to make correct diagnosis, indicate that this disorder should be taken into account more often when diagnosing abdominal pain in children.

Key words: abdominal pain, lactose malabsorption, lactose intolerance, children

INTRODUCTION

Abdominal pain in children is one of the most frequent reasons for consulting a general practitioner. Diagnostics of abdominal pain in children is particularly difficult. One of the causes of this disorder can be lactose intolerance. Lactose, also called milk sugar, is a disaccharide formed from monosacharides-galactose and glucose. Milk and dairy products are the main sources of lactose for human beings. The content of lactose in human breast milk amounts to 5.5%-7.5%, while cow's milk contains approximately 4.5%. The lactase enzyme splits lactose into glucose and galactose, and is located on the surface of the cells that line the small intestine. A deficiency or lack of this enzyme leads to lactose digestion disorders and, as a consequence, to the occurrence of symptoms indicating its intolerance. It is important to emphasize that lactase deficiency is not the same as lactose intolerance. The severity of the symptoms vary greatly from person to person. Persons with milder deficiencies of lactase often have no symptoms after the ingestion of milk. For reasons as yet unclear, even persons with moderate lactase deficiency also may not have any symptoms [1]. The diagnosis of lactase deficiency is made when the amount of lactase in the intestine is reduced, but a diagnosis of lactose intolerance is made only when the reduced amount of lactase causes symptoms.

The aim of this study was to assess the frequency of lactose malabsorption and lactose intolerance in children with abdominal pain, as well as to measure the time-lag between onset of symptoms and diagnosis.

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MATERIALS AND METHOD

The studies were conducted in 2008-2010. They comprised of 170 children aged 2-18 years with abdominal pain, who were patients in the Paediatric Gastroenterology Outpatient Clinic at the Institute of Mother and Child in Warsaw. Some of these children suffered from other gastrointestinal symptoms, such as vomiting, nausea, diarrhoea or abdominal distension. The children were divided into 2 groups, based on the age. The first group consisted of 121 children, 60 girls and 61 boys aged 2-7 years (mean age 3.8 ± 1.4 years); the second group consisted of 49 children, 24 girls and 25 boys aged 8-18 years (mean age 12.9 ± 3.5 years). The criteria for exclusion from the study included: antibiotic therapy during the month preceding the test, dental caries, bacterial or parasitic infections of the gastrointestinal tract, and disbacteriosis. The occurrence of disbacteriosis was confirmed by the result of the hydrogen

breath test, in which the profile of the concentration of breath hydrogen in exhaled air showed an early peak.

In all children, after the ingestion of lactose, a hydrogen breath test (HBT) was performed using a Gastrolyzer (Bedfont Scientific Ltd., UK). The test was conducted in accordance to generally accepted standards. In children from the first group, exhaled air samples were collected with a face mask; in children from the second group – with the use of a mouthpiece. After an overnight fast and oral administration of a standard dose of lactose (1.75 g/kg bm, max. 50 g), the samples of exhaled air were collected at 30 min. intervals for 2 hours. The increase in hydrogen concentration in exhaled air ⩾ 20 parts per million (ppm), in respect to the initial value (fasting), were considered as positive test results indicating lactose malabsorption. In order to detect any undesirable gastrointestinal symptoms indicating lactose intolerance, the parents were instructed to observe their children during the 24-hour after the test.

Among children with lactose intolerance the mean time-lag between symptoms onset and diagnosis was calculated.

In children diagnosed with lactose malabsorption or lactose intolerance, the mean lactose intake was calculated on the basis of 3-day diet records and recalls using computer programme Dietician 2, with a database of the nutritional value of the food products. Student's t-test for unrelated pairs was used for the analysis of the obtained results.

The parents signed a consent form in order to allow participation of the children in the research.

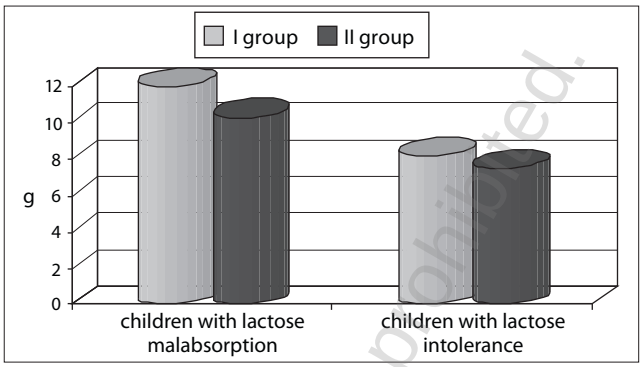

Figure 1 Mean lactose intake in children with lactose malabsorption and lactose intolerance.

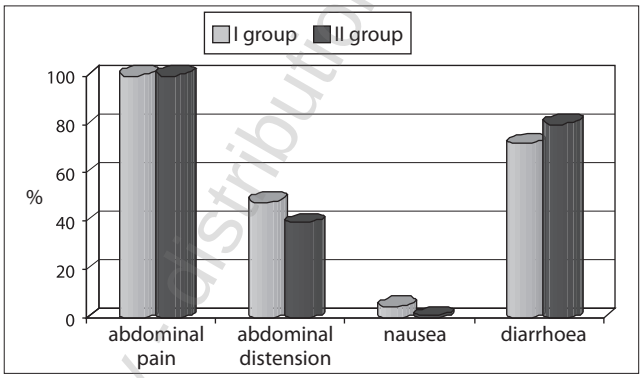

Figure 2 Gastrointestinal symptoms in children with lactose intolerance.

RESULTS

In the first age group, positive results of HBT test, confirming the diagnosis of lactose malabsorption, were found in 16 children (13%). Thirteen (10.7%) children from this group, 6 (26.7%) children with positive and 7 (5.7%) with negative test, developed clinical symptoms after oral ingestion of lactose. The time-lag between first symptoms and lactose intolerance diagnosis was mean 7 ± 2 months.

The remaining children from this group were diagnosed with pathological gastroesophageal reflux, food allergies, dietary errors (excessive amounts of snacks, sweets, juices, chips in their diets) or psychogenic factors (appearance of siblings in the family, adaptation to a day nursery or kindergarten). The cause of symptoms among 11 (9%) children remained undetermined.

In the second group of children, a positive HBT result was obtained in 17 children (34%), and clinical symptoms after the test developed in 10 (20.4%), 6 (28%) children with positive HBT result and 4 (8.1%) with a negative result. In children from this group, the time between the first symptoms and diagnosis of lactose intolerance was mean 14 ± 4 months.

Other children from this group suffering from abdominal pain were diagnosed with food allergies, dietary errors (excessive amounts of sweets, juices, soft drinks, not eating breakfast, irregular meals), gallbladder stones, gastric ulcer, celiac disease, irritable bowel syndrome, or psychogenic factors (problems at home or school).

In children with lactose malabsorption from the first age group, the mean intake of lactose was 12 ± 3.2 g, and from the second group 10.3 ± 2 g. The mean intake of lactose in children diagnosed with lactose intolerance from the younger group was 8.2 ± 2.4 g, while in children from older group – 7.5 ± 1.3 g.

DISCUSSION

The most common clinical symptoms of lactose intolerance are abdominal pain and abdominal distension, flatulence, nausea or diarrhoea [2, 3]. They occur as the result of consuming lactose in amounts exceeding the capacity of the intestines to digest it. A few types of lactose intolerance, depending on the cause, genetics and/or time of onset of symptoms, were distinguished. They include the following: congenital lactose intolerance, called alactasia, secondary intolerance of this disaccharide, and primary lactase deficiency, called adult-type hypolactasia [4-6]. Congenital lactose intolerance is a rare, genetically conditioned metabolic defect connected with the total absence of lactase activity. Clinical symptoms of this disease occur within the first days of a child's life. Another type of lactose intolerance is its secondary deficiency, which results from diseases which cause damage to the brush border of the enterocytes [7]. This type of lactose intolerance is usually transient, and its symptoms abate after regenerating the damaged intestinal villi. The most common type of lactase deficiency is an adult-type hypolactasia. It is characterised by a decrease of lactase activity, progressing with age. The activity of this enzyme in adults amounts to approximately 10% of activity diagnosed in the infant period [7]. This type of lactose intolerance is conditioned by multiple factors, the most significant of which seem to be genetic and ethnic conditioning. Clinical symptoms of adult-type hypolactasia in subjects of Caucasian origin usually appear at the age of 5-7 years [8]. In Poland, the frequency of occurrence of adult-type hypolactasia, according to various authors, ranges from 17.39%-37.5 % [3, 9, 10].

According to Landowski's studies, this type of hypolactasia occurs in 18.6% of children at the age of 3-7 years, 37.1% of children at the age of 7-15 years, and in 37.7% at the age of 15-18.9 years [11], whereas the frequency of occurrence of this

type of hypolactasia in children aged 7-15 given by Szostak-Węgierek amounts to 19.4% [12].

In our study, positive HBT result indicating lactose malabsorption was obtained in 13% of the children (16/121) aged 2-7 and in 34% (17/49) of children aged 8-18 years. Teitelbaum et al. observed a positive hydrogen breath test consistent with sugar (lactose, fructose and sucrose) malabsorption in 5 out of 31 (16%) of school age children. Three of these subjects were confirmed as having lactose malabsorption, based on small bowel lactase enzyme analysis, or subsequent lactose hydrogen breath test [13].

In our study, clinical symptoms after oral ingestion of lactose occurred in 13 children (10.7%) from first group, and in 10 (20.4%) children from the second group. It is worth emphasizing that not all children with lactose malabsorption developed clinical symptoms after the HBT test.

In 26.7% – 6/16 of the children – aged 2-7 years with lactose malabsorption, clinical symptoms indicating lactose intolerance, such as diarrhoea, abdominal distension or abdominal pain were observed after the oral lactose load test. However, in the group of children with lactose malabsorption at the age of 8-18, symptoms of intolerance of this disaccharide occurred in 28% (6/17) of children. It is also interesting that 5.7% of the younger and 8.1% of the older children with negative HBT test results developed adverse gastrointestinal symptoms after the load test.

The occurrence of gastrointestinal symptoms after the oral lactose load test in children from the 2 groups, both diagnosed and undiagnosed with lactose malabsorption, can advocate for their multifactorial conditioning.

The higher frequency of occurrence of lactose malabsorption and intolerance in older than in younger group of children may show the decrease in lactase activity with age.

However, the occurrence of lactose intolerance symptoms seems to be dependant not only on the activity of lactase, but also on the amount of disaccharide consumed. Some patients with lactose malabsorption or intolerance tolerate milk and dairy products, while some of them require restrictions in the supply of lactose in their diets. There was evidence that most individuals with this diseases can tolerate 12-15 grams of lactose, which is equal to approximately 1 cup of milk in an all day diet [14, 15]. The source of this disaccharide in the diet also seems to be of significance [1].

The present study showed a lower consumption of lactose by the children with lactose intolerance, compared to the children with its malabsorption. Such results may indicate an intuitive limiting of its supply in the diets of children with lactose intolerance, probably depending on a worse tolerance of this sugar.

The children diagnosed with lactose intolerance were recommended a diet with a lactose-reduced supply, based on low-lactose milk and fermented milk products. In addition, probiotics were recommended with regard to their properties of facilitating lactose absorption [16].

In 4 patients from the second group, despite a low-lactose diet, gastrointestinal symptoms were still observed. For this reason, the addition of lactase enzyme to dairy meals was recommended.

The relatively long period of time from the first symptoms to making diagnosis indicates that the general practitioner rarely takes lactose intolerance into account while making the differential diagnosis of abdominal pain in children. Often children are not recommended a low lactose diet, or they are not referred to a specialist to confirm the disease as quickly as possible.

Correct diagnosis of lactose intolerance and its appropriate management result in regression of its symptoms, and may prevent future consequences of this disease, such as osteopenia or osteoporosis. Children with a low lactose intake may have beneficial bone outcomes resulting from an appropriate and individualised dairy intervention.

CONCLUSIONS

Among children aged 2-7 years the frequency of lactose malabsorption and lactose intolerance were 13% and 10.7%, respectively.

Among children aged 8-18 years the frequency of lactose malabsorption and lactose intolerance were 34% and 20.4%, respectively.

The frequency of lactose intolerance shown by this study, as well as relatively long period of time required to make a correct diagnosis, indicates that this disorder should be taken into account more often when diagnosing abdominal pain in children.

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