Lactose intolerance

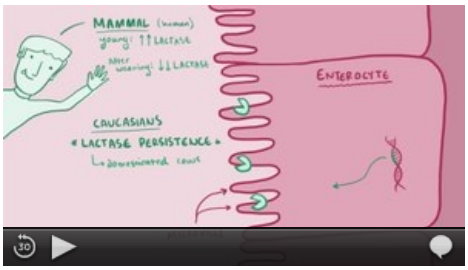
Lactose intolerance/ malabsorption is when the ability to digest lactose ("milk sugar") is impaired.

One may often come across the inaccurate term Milk allergy, which the general public may refer to as lactose intolerance or Cow milk protein allergy - **it is important to find out**, which of these disorders the patient suffers from.

Pathophysiology

Undigested lactose travels to the large intestine, where it is fermented by bacteria and forms hydrogen, methane, carbon dioxide, lactate and short-chain fatty acids. This results in **osmotic diarrhoea** and when persisting for a longer period of time, malabsorption syndrome symptoms may occur. It is manifested by abdominal pain, flatulence, diarrhoea, nausea and vomiting. It is diagnosed based on anamnesis, stool examination (pH <5, reducing substances> 0.5%), positive Lactose tolerance test and the disappearance of symptoms after elimination of lactose from the diet. In case of lactose intolerance, a lactose-free diet is served, and lactase can be added to dairy products. With a limited intake of dairy products, it is necessary to supplement calcium.

Lactose is a disaccharide that is broken down by lactase in the small intestine into glucose and galactose (monosaccharides). Only monosaccharides can be absorbed in the small intestine. Lactose occurs naturally only in the milk of mammals, except for marine ones. It is added to infant formulas in an effort to bring their composition closer to breast milk. It increases the absorption of calcium in the intestine and is therefore effective in preventing rickets and osteomalacia. It acts favourably as a growth factor for some bacterial intestinal strains. It is also included in many solid drugs as an additive to tablet formulas.



Lactose intolerance

Lactase is one of the many brush border enzymes of enterocytes. It is a protein produced in the enterocyte that breaks down lactose. Lactase activity is present in the fetal gut before delivery. It's activity increases during pregnancy and decreases after weaning (from breastfeeding). Lactase activity is genetically determined and is only minimally affected by external influences. Even prolonged lactose exposure or its exclusion from the diet does not affect lactase activity. Around 3. – 4. years the ability to absorb lactose decreases. This reduction is genetically encoded and is not dependent on lactose consumption. A distinction is made between primary (congenital) lactase deficiency and secondary deficiency accompanying severe intestinal mucosal damage.

Diagnosis

- anamnesis: clinical difficulties after consuming milk and dairy products or products containing lactose;
- determination of hydrogen in exhaled air - the large intestine practically as the only organ in the body produces hydrogen, which is absorbed into the bloodstream by the intestine and subsequently exhaled by air in a proportion corresponding to the concentration of hydrogen in the blood; hydrogen production is directly proportional to the number of carbohydrates in the gut; the amount of hydrogen in the exhaled air is thus a measure of the malabsorption of the given carbohydrate; the fasting patient is given a lactose test drink and the increase in hydrogen concentration in the exhaled air is evaluated;
- stool examination: low pH, presence of reducing agents as a manifestation of unabsorbed lactose;
- genotyping - allows diagnosing the adult type of hypolactasia.

Primary lactose intolerance/malabsorption of lactose

Congenital (primary) lactase deficiency

- very rare;
- it manifests in form of diarrhoea from the moment the baby is given milk, including breast milk;
- the stools are watery, foamy and acidic;
- identification: molecular genetic testing;
- treatment: dietary measures - lactose-free milk, drugs containing lactase supplementation.

Lactose malabsorption with late lactase deficiency - adult hypolactasia

- autosomal recessive inheritance;
- corresponds to the physiological process of declining enzyme activity that begins after weaning and occurs at any time from childhood to adulthood;
- diagnostics: molecular genetic testing or intestinal biopsy;
- incidence in Caucasian-Europeans in 20-25%, in African Americans in 80%, in South Asians in almost 100%

Temporary lactase deficiency in preterm infants

In premature (pre-term) infants, relatively low lactase activity persists until the 36th gestational week.

Secondary intolerance / lactose malabsorption

- reduced ability to tolerate the disaccharide lactose ("milk sugar");
- may temporarily occur after acute diarrheal disease - the decrease in intestinal lactase activity is proportional to the degree of damage to the intestinal mucosa;
- accompanies diseases associated with atrophy of the small intestinal mucosa, such as chronic diarrheal diseases of children, intestinal infections, food allergies /eosinophilic gastroenteropathies, chronic inflammatory bowel disease, celiac disease, immune defects, short intestine, marasmus, kwashiorkor;
- in differential diagnosis, it is always necessary to rule out the celiac disease by serological examination
- lactose intolerance is indicated by the presence of more than 0.5% of reducing carbohydrates in the faeces and a faecal pH lower than 5.0
- treatment: transient exclusion of lactose from the diet.

Lactose in the diet

Dairy products with descending lactose content: buttermilk - native milk - cream - whipped cream - fermented products (sour milk, kefir, yoghurts, if produced by fermentation process), from solid dairy products the lactose content in curd is comparable to whipped cream and in descending order are hard cheeses - melted cheeses - butter.

Dishes that may contain milk: sausages, burgers, frozen and canned meat and fish in sauce or breaded; cereal products: cereals, biscuits, buns, cakes; dairy products: margarine, frozen, dehydrated and preserved creams, ice cream; fruits and vegetables: preserved and dehydrated; confectionery: milk chocolate, filled confectionery, tofe; some types of muesli, instant soups, salad dressings, baking mixes, all products that contain whey or casein.

Other sources of calcium should be recommended if large or absolute restrictions on milk and milk products are required.

Links

References

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2. FRÜHAUF, Pavel – SZITÁNYI, Peter. *Výživa v pediatrii.* 1. edition. Praha : Institut postgraduálního vzdělávání ve zdravotnictví, 2013. ISBN 978-80-87023-26-6.

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