Lactose Intolerance

Lactose intolerance is due to lactase deficiency, which leads to a decrease in lactose absorption and increased osmotic load. This can manifest as abdominal pain, flatulence, and diarrhea. Lactose intolerance can be diagnosed with a positive hydrogen breath test and decreased stool pH. It can be treated by avoiding dairy products and lactase supplementation.



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Pathophysiology

Lactase Deficiency

Milk-carton-ace Broken

Lactase works by converting lactose, a disaccharide form of sugar, to glucose and galactose which is absorbable in the gut. Lactase is mainly located in the epithelial cells of the small intestinal brush border. Without lactase, lactose is unable to be absorbed by the gut, resulting in lactose intolerance. Primary lactase deficiency is most prevalent in Asian, African, and Native American populations. Secondary lactase deficiency occurs as a result of injury to the small bowel brush border (e.g. from infection or inflammation). Lactase deficiency can also be congenital, but this is rare.

Decreased Lactose Absorption

Down-arrow Milk-carton Absorbing-sponge

The inability to break down lactose results in decreased lactose absorption in the small intestine. Lactose needs to be broken down by lactase to be absorbable by the bowel.

Increased Osmotic Load

Up-arrow Water Load

Lactose that cannot be absorbed will then be fermented by bacteria to form monosaccharides that are not absorbable by the gut. Unabsorbable lactose and monosaccharides in the gut lead to an increase in osmotic load, which will draw more water into the stool resulting in diarrhea.

Presentation

Abdominal Pain

Abdominal Pain-bolts

Lactose intolerant patients can experience abdominal pain. Patients have trouble consuming fresh milk but can sometimes still eat other dairy products without any problem. These products are made through fermentation resulting in more breakdown of lactose. Examples of these products include yogurt and cheese.

Flatulence

Farting

Flatulence, fatigue, and bloating can also be present in patients with lactose intolerance. These symptoms occur due to the accumulation of gas produced by intestinal flora due to their activity in fermenting undigested lactose.

Diarrhea

Toilet

Symptoms from lactose intolerance can present 30 minutes to 2 hours after eating/drinking dairy products that contain lactose (e.g., milk). The buildup of undigested lactose results in osmotic diarrhea. This type of diarrhea happens from the increase of stool osmolality, which draws more water into the bowel lumen.

Diagnosis

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Positive Hydrogen Breath Test

Hydrogen Positive Breath Test

The increase of hydrogen content in the breath results from bacteria that are actively fermenting undigested lactose. The most appropriate screening test for lactase deficiency is the hydrogen breath test. The patient consumes an amount of lactose during the test. The test will detect hydrogen, carbon dioxide, and methane from the lungs. These substances are produced from undigested lactose fermented by intestinal flora.

Decreased Stool pH

Stool-kicked-down Decreased pH less than 7.35

The buildup of unabsorbed lactose in the gut of lactose intolerant patients will enter the large intestine and cause bacteria to produce short-chain fatty acids, resulting in a decreased stool pH. Typically, the pH of stool is alkaline. Acidic stool may be found in other several disorders such as E. coli and Rotavirus infection or overgrowth of acid-producing bacteria.

Management

Avoid Dairy

Avoid-sign with Dairy-products

Patients with lactose malabsorption can often tolerate up to 12 g of lactose without significant symptoms. Diet restriction should be the first step in treating this problem, with gradual reintroduction of lactose to determine sensitivity. To reduce symptoms that may come from consuming lactose, patients can consume fermented and matured milk products, have lactose together with other foods, and space out lactose consumption throughout the day.

Lactase Supplementation

Milk-carton-ace

Lactase pills can allow patients with lactose intolerance to consume lactose-containing products. The pill is consumed before taking meals or can be added along to the lactose product.

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