

Lactose intolerance

Lactose digestion in the small intestine may be incomplete if lactase level is lower than necessary. Unabsorbed lactose may be fermented in the colon by bacteria, which leads to the production of carbon dioxide, hydrogen and methane, propionic and butyric acids (short chain fatty acids). Most of the gas is absorbed across the lining of the colon into blood stream. The gas is then transported to lung via the blood stream and from blood it is exchanged into the airways of lung and breathed out [1,2]. It is believed also that lactose increases osmotic load and the intestinal water content. Symptoms of lactose intolerance include diarrhea, gas, cramping, and bloating [1]. Less often it can present with nausea or constipation and a range of systemic symptoms, including headaches, fatigue, loss of concentration, muscle and joint pain, mouth ulcers, and urinary difficulties [3].

Lactose hydrogen test. Protocol: baseline hydrogen measurements are taken in expired breath. Fasting subjects are given 50 g lactose orally mixed with water. Further samples to detect the hydrogen quantity are taken at 15-30 min time intervals continued over a period of 4 h. Detection of more than 10-20 ppm over the baseline hydrogen value (detected in at least 2 breath samples) indicates lactose malabsorption [4].

An analysis of the literature reveals some contradictions that cast doubt on the above-described mechanism for the onset of symptoms with lactose intolerance.

First, typical symptoms occur about hour or 2 after eating dairy products [5]. Meanwhile, the normal small bowel transit time is 4.2 hours [6], and the spread of the product in the colon and the process of lactose fermentation takes even longer. It follows that the symptoms of lactose intolerance appear before lactose enters the colon.

Secondly, during the lactose H₂ breath test, an increase in the exhaled hydrogen begins already 30 minutes after the intake of lactose (**Figure 1**) [7]. Such rapid penetration of lactose into the colon is unbelievable.

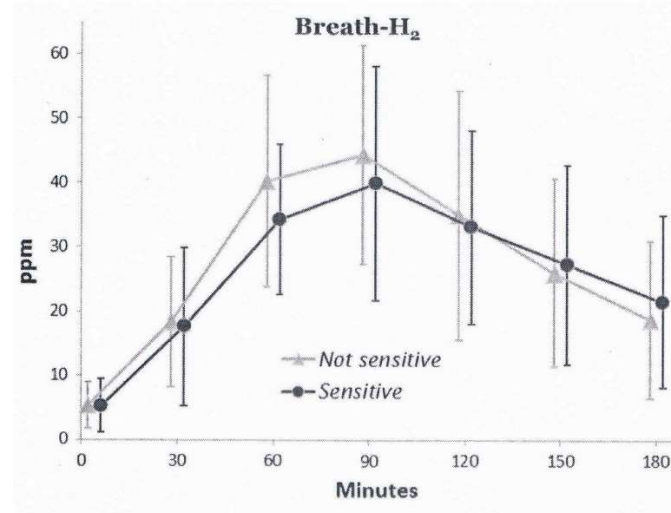


Figure 1. End-expiratory breath hydrogen (ppm) over time in fructose malabsorbers [7]. Pattern of lactose and fructose intolerance are not different from each other [8].

Thirdly, the H₂-breath test can be false-negative due to the presence of hydrogen non-producing bacteria in the colon (2% -43%) [1,2]. It follows that in a significant number of patients with lactose intolerance, the onset of typical symptoms has nothing to do with gas formation in the large intestine.

Fourth, Lactose and food intolerance cause a wide range of gut and systemic symptoms, including gas, gut pain, diarrhea or constipation, severe headaches, severe fatigue, loss of cognitive functions such as concentration, memory and reasoning, muscle and joint pain, heart palpitations, and a variety of allergies [9]. Most systemic symptoms are difficult to explain by gassing in the colon.

Fifth, “the major limitation of the genetic, enzymatic and gaxilose tests is that lactose malabsorption is common in healthy individuals, and a positive test does not confirm that symptoms are caused by this condition. Indeed, among individuals referred for hydrogen breath test, about half of those with normal

lactose digestion report abdominal discomfort after an unblinded lactose challenge” [10].

Sixth, Uribe et al showed that «no side effects were evident in patients with treated with lactose enemas (20%; 1000 ml t.i.d.). Lactose enemas are a safe and effective treatment for acute portal systemic encephalopathy" [11,12].

What is a gold standard? "If someone experiences typical symptoms about an hour or 2 after eating dairy products and it can be confirmed that the symptoms are caused by dairy rather than other foods, lactose intolerance can be presumed" [5]. However, "it is not possible to make a definitive diagnosis on clinical presentation alone because double-blind trials have shown that the association of self-reported lactose intolerance and the occurrence of symptoms after lactose ingestion are very poor, even in patients with lactase deficiency" [1]. Meanwhile, it is known that "The H₂-breath test can be false positive in the presence of small intestinal bacterial overgrowth; however, a larger problem is false-negative tests due to the presence of hydrogen non-producing bacteria in the colon (2%-43%) [1,3].

Conclusion

From the analysis of the literature it follows that:

a) The lactose test, that is, the appearance of symptoms after taking lactose, is considered the most accurate diagnostic method for lactose intolerance.

b) If heartburn or abdominal pain occurs через 15-20 minutes after drinking coffee-cappuccino, it means that in the pathogenesis of lactose intolerance is some other mediator(s) that causes clinical symptoms before lactose reaches the colon.

c) The validity of the generally accepted hypothesis of the pathogenesis of lactose intolerance can be verified by the hydrogen breath test after a lactose enema.

References

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