Genetic versus breath testing for hypolactasia and diagnostic value of 48-hour symptom assessment

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Introduction:
Lactase deficiency (LD) is the most common cause of lactose intolerance (LI), a highly prevalent condition that frequently causes abdominal pain, bloating and diarrhea. The standard test to diagnose lactase deficiency is the hydrogen breath test (H_2-BT), which is based on hydrogen exhalation in response to an oral lactose challenge and symptom assessment. Recently the single-nucleotid-polymorphism C/T_{13910} has been associated with lactase. In addition to assessment of typical intestinal symptoms during examination recording of extraintestinal symptoms for prolonged periods has been suggested. Data supporting this concept are sparse.

Aim:
To evaluate the agreement between genetic testing C/T_{13910} and lactose H_2-BT and the diagnostic value of extended intestinal and extraintestinal symptom assessment.

Methods:
Patients (total 194, 139 f; mean age 38, range 11-79 years) with clinical suspicion of lactose intolerance underwent a 4-hour H_2-BT after intake of 50 g of lactose and serologic genetic testing for C/T_{13910}. During the H_2-BT, patients rated 5 intestinal symptoms (abdominal pain, borborygmi, diarrhea, bloating and nausea) and 4 extraintestinal symptoms (headache, fatigue, dizziness and muscle/joint pain) on a 9-point Likert Scale for 15 minutes up to 4 hours and every 4 hours thereafter for a maximum of 48 hours. The H_2-BT was considered positive with a rise of exhaled hydrogen >20 ppm over baseline on at least two consecutive measurements. CC_{13910} was considered indicative for lactase deficiency.

Results:
When considering the H_2-BT as gold standard, CC_{13910} had a sensitivity of 97% and specificity of 95% with a kappa of 0.9. Positive predictive (PPV) and negative predictive value (NPV) were calculated being 90% and 98% respectively. Symptom assessment yielded significant differences ($p<0.05$) for intestinal symptoms abdominal pain, bloating, borborygmi and diarrhea between patients with respectively without hypolactasia between 120 minutes and 4 hours after oral lactose challenge. Extraintestinal symptoms and extension of symptom assessment up to 48 hours did not show consistently different results.

Conclusion:
Genetic testing has an excellent agreement with the standard lactose hydrogen breath test and could replace breath testing for the diagnosis of lactase deficiency. Extended symptom scores and assessment of extraintestinal symptoms are of no diagnostic benefit in the evaluation of lactase deficiency.