Incidence of β-lactoglobulin intolerance among lactose intolerance suspected population and diagnostic approach

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Introduction and Objectives

Milk and dairy products have a high nutritional value, due to its protein, vitamin, mineral and fatty acid content[1]. However, regular usage of these products in some individuals may result in manifestation of adverse reactions, such as lactose intolerance (LI) and cow`s milk protein intolerance (CMPI). LI is a syndrome with primarily gastrointestinal symptoms as a result of lactase deficiency in the intestinal mucosa and lactose malabsorption. CMPI is an immune mediated reaction to milk`s proteins causing abdominal pain, diarrhea, vomitus, nausea etc. Since LI is highly prevalent in the population, while clinical features of LI and CMPI are similar, the last is often misdiagnosed[2]. The aim of this study was to determine the incidence of β-lactoglobulin intolerance (the most frequent form of CMPI) in LI suspected population and to identify diagnostic tools that can help to differentiate CMPI and LI.

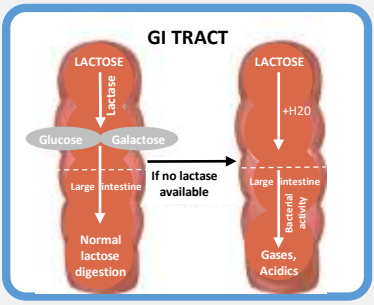

Image 1. The mechanism of LI symptoms occurrence

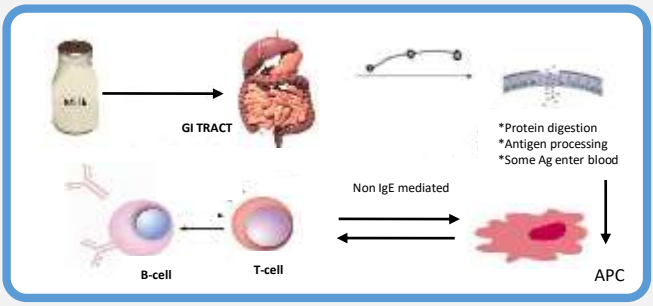

Image 2. The mechanism of CMPI occurrence

Materials and Methods

The study included 71 patients suspect of LI after medical examination and routine analysis. DNA and sera samples were used to test LCT polymorphisms (Sugar Intolerance StripAssay® kit, ViennaLab Diagnostics, Austria) as well as the presence of anti-β-lactoglobulin antibodies (BlueDot Milk Intolerance IgG kit, D-tek, Belgium). Most of the participants, upon entering the study, fulfilled a questionnaire concerning their medical condition, including symptoms, time of their development and type of food that triggered those symptoms.

Results and Discussion

Correlation analysis between LCT genotype and presence of anti-β-lactoglobulin antibodies in patients suspected to have LI was done and statistical significance was confirmed $\chi 2(2, N=71)$, $p=0.22$. Data shows that 40/71 patients have primary LI, 23/71 may have secondary LI, 7/71 have CMPI and 1 need additional assessment. Different nutritional restrictions should be implemented, as suggested in the short communication.

Forty-one patients fulfilled a questionnaire concerning their medical condition. To identify possible differential tools in diagnosis establishment, patients were divided in 3 groups, according to the laboratory testing results. G1 patients with primary LI, G2 with presumed secondary LI and G3 with CMPI. Data analysis emerged abdominal pain and bloating as more frequent symptoms in G1 group, while other symptoms were almost equally present in all groups. Problematic foods triggered symptoms within 2 h of ingestion in most of the LI patients (G1), while CMPI patients experienced symptoms constantly (G3) (occurrence in less than 2h). Regarding the food that triggers symptoms, milk was problematic for all participants due to lactose and proteins. All CMPI patients could not tolerate dairy products compared to 56.16% of LI patients.

Table 1. Correlation analysis of LCT genotype and presence of anti-β-lactoglobulin antibodies in patients suspected to have LI

		G1 - Genotype LCT13910TT/ LCT22018AA	G2 - Genotype LCT13910TC/ LCT22018AG	G3 - Genotype LCT13910CC/ LCT22018GG	Total
Number of patients		**4** (5,64%)	**26** (36,62%)	**41** (57,74%)	**71**
anti-β-lactoglobulin antibodies	Positive result	**1** (1,36%)	**6** (8,54%)	**1** (1,36%)	**8**
	Negative result	**3** (4,23%)	**20** (28,17%)	**40** (56,34%)	**63**
	p value				**0,022**

Conclusion

Our analysis revealed that 11.27% of LI suspected patients have β-lactoglobulin intolerance. LI can be developed at any age, while CMPI is more likely to occur during childhood. Even though the clinical manifestation of LI and CMPI is very similar, there are some indicators that can help differentiating these conditions one from another. Time of symptom appearance and type of food that triggers those symptoms seems to be relevant.

References:
1. FAO., 2013. Milk and dairy products in human nutrition. FAO. https://doi.org/10.1111/1471-0307.12124
2. DI Costanzo, M.,BerniCanani, R., 2019. Lactose Intolerance:Common Misunderstandings. Ann.Nutr.Metab.73 (Suppl 4), 30–37. https://doi.org/10.1159/000493669