INTERNATIONAL JOURNAL OF IMMUNOPATHOLOGY AND PHARMACOLOGY Vol. 24, no. 2, 535-537 (2011)

LETTER TO THE EDITOR

LACTOSE INTOLERANCE IN SYSTEMIC NICKEL ALLERGY SYNDROME

I.A. CAZZATO[1,2], E. VADRUCCI[2], G. CAMMAROTA[1], M. MINELLI[2] and A. GASBARRINI[1]

[1]Internal Medicine and Gastroenterology Unit, Internal Medicine Department, Gemelli Hospital, Catholic University of Sacred Heart, Rome; [2]IMID Unit, Internal Medicine Department, San Pio Hospital, Campi Salentina, Lecce, Italy

Received March 1, 2011 – Accepted April 15, 2011

Some patients affected by nickel-contact allergy present digestive symptoms in addition to systemic cutaneous manifestations, falling under the condition known as Systemic Nickel Allergy Syndrome (SNAS). A nickel-related pro-inflammatory status has been documented at intestinal mucosal level. The aim of the present study is to evaluate the prevalence of lactose intolerance in patients affected by SNAS compared to a healthy population. Consecutive patients affected by SNAS referring to our departments were enrolled. The control population consisted of healthy subjects without gastrointestinal symptoms. All subjects enrolled underwent lactose breath test under standard conditions. One hundred and seventy-eight SNAS patients and 60 healthy controls were enrolled. Positivity of lactose breath test occurred in 74.7% of the SNAS group compared to 6.6% of the control group. Lactose intolerance is highly prevalent in our series of patients affected by SNAS. Based on our preliminary results, we can hypothesize that in SNAS patients, the Nickel-induced pro-inflammatory status could temporarily impair the brush border enzymatic functions, resulting in hypolactasia. Further trials evaluating the effect of a nickel-low diet regimen on lactase activity, histological features and immunological pattern are needed.

Nineteen percent of patients with nickel contact allergy, present digestive symptoms in addition to systemic cutaneous manifestations after ingestion of nickel-rich foods and experience symptom reduction with a low-nickel diet. The most common gastrointestinal symptoms include nausea, gastric pyrosis, meteorism, abdominal pain, diarrhea. This condition is known as Systemic Nickel Allergy Syndrome (SNAS) (1-2). It has been demonstrated that Nickel assumption in SNAS patients is associated to an infiltrate of lymphocytes and plasma cells with edema and vasodilatation of the lamina propria at gastrointestinal mucosal level (2). Moreover, an apoptotic decrease of epithelial CD8+ cells and an infiltration of CD4+ cells have been detected after oral challenge with the metal as well as a significant increase of plasmatic ICAM-1, IL13, IL5 and eosinophilic cation protein (3-4).

Lactose, a disaccharide composed of glucose and galactose bound in a ß-glycosidic linkage, is the primary carbohydrate found exclusively in the mammalian milk. Absorption of lactose requires lactase-phlorizin hydrolase (LPH) activity in the small intestinal brush border to break the linkage between the two monosaccharides, a step preceding the transport of glucose and/or galactose across the brush border membrane.. Primary adult-type hypolactasia, an autosomal recessive condition resulting from the physiological decline of LPH enzyme activity in the intestinal cells, occurs in

Key words: systemic nickel allergy syndrome, lactose intolerance, hydrogen breath test

Mailing address: Immacolata Alessia Cazzato, MD, PhD
Internal Medicine and Gastroenterology Unit,
Internal Medicine Department,
Catholic University of Sacred Heart,
Gemelli Hospital, Rome
Tel: ++39 328 2326917 Fax: ++39 0832 871099
e-mail: alessiacazzato@gmail.com

0394-6320 (2011)

a large proportion of individuals (5). Secondary causes of hypolactasia, such as celiac disease, gastroenteritis, small bowel bacterial overgrowth and Crohn's disease, may lead to transient lactase deficiency and appearance of abdominal symptoms similar to those of primary lactose malabsorption (5-7).

The aim of the present study is to evaluate the prevalence of lactose intolerance in patients affected by SNAS compared to a healthy population. Consecutive SNAS-patients referring to our departments from September 2009 to September 2010 were screened and enrolled. SNAS diagnosis was based on history (association of gastrointestinal and cutaneous symptoms), positive nickel patch test, beneficial effects of nickel-free diet and positivity of a double blind placebo-controlled oral nickel challenge. SNAS patients were also evaluated for their sensitivity to cobalt and thimerosal. Exclusion criteria were the presence of gastrointestinal disorders and infections, chronic drug usage, major systemic disorders. Diagnosis of lactose intolerance was based on lactose hydrogen breath test (LBT) positivity under standard conditions. No patient had taken laxatives in the 30 days preceding the test. Subjects were asked to have a carbohydrate-restricted dinner on the day before the test and fast for at least 12 hours to minimize basal hydrogen (H_2) excretion. Physical exercise was not allowed for 30 minutes before and during the test. End-alveolar breath samples were collected immediately before lactose ingestion (lactose 25 g in a 10% water solution). Samples were taken every 30 minutes for 4 hours and analyzed immediately for H_2 by a gas chromatograph. The results were expressed as parts per million (ppm). A positive test required a rise in H_2 concentration in the expired air higher than 20 ppm over basal values (5, 7).

One hundred and seventy-eight patients affected by SNAS (20 Males, 158 Females, mean age 41±12) and 60 healthy controls (21 Males, 39 Females, mean age 45±7), were enrolled. Sixty-two percent of SNAS patients (110 patients; Group A) showed mono-sensitivity to nickel, whereas the remaining 38% (68 patients; Group B) were also sensitive to cobalt and/or thimerosal. Demographic features of the patients and controls were not statistically different.

One hundred and thirty-three of the 178 SNAS patients (74.7%; 11 Males, 122 Females, mean age 41±12) showed a positive LBT compared to 4 of the 60 controls (6.6%; 1 Male, 3 Females). LBT positivity occurred similarly in both Groups A and B (Group A: 81/110 positive LBT, 74%; Group B: 52/68 positive LBT, 76%; p=ns).

Lactose intolerance is highly prevalent in our series of patients affected by SNAS. In these patients, nickel seems to be the leading factor in the impairment of the small bowel functional morphology, as co-sensitivity to cobalt and/or thimerosal does not appear significant. Preliminary results of our study suggest that in SNAS patients, the nickel-induced pro-inflammatory status could temporarily impair the brush border enzymatic functions, resulting in hypolactasia. Further trials evaluating the effect of a nickel-low diet regimen on lactase activity, histological features and immunological pattern are needed. Lactose breath test could be proposed in the future as a safe, feasible and cost-effective tool able to monitor intestinal involvement in SNAS patients.

REFERENCES

1. Schiavino D, Nucera E, Alonzi C, et al. A clinical trial of oral hyposensitization in systemic allergy to nickel. Int J Immunopathol Pharmacol 2006;19:593-600.
2. Falagiani P, Di Gioacchino M, Ricciardi L, et al. Systemic nickel allergy syndrome (SNAS): A review. Rev Port Imunoalergologia 2008; 16:135-47.
3. Di Gioacchino M, Boscolo P, Cavallucci E, et al. Lymphocyte subset changes in blood and gastrointestinal mucosa after oral nickel challenge in nickel-sensitized women. Contact Dermatitis 2000; 43:206-11.
4. Minelli M, Schiavino D, Musca F, et al. Oral hyposensitization to nickel induces clinical improvement and a decrease in TH1 and TH2 cytokines in patients with systemic nickel allergy syndrome. Int J Immunopathol Pharmacol 2010; 23: 193-01.
5. Law D, Conklin J, Pimentel M. Lactose intolerance and the role of the lactose breath test. Am J Gastroenterol 2010; 105:2308.

6. Suchy FJ, Brannon PM, Carpenter TO, et al. National Institutes of Health Consensus Development Conference: lactose intolerance and health. Ann Intern Med 2010; 152:792-6.

7. Gasbarrini A, Corazza GR, Gasbarrini G, et al. Methodology and indications of H2-breath testing in gastrointestinal diseases: the Rome Consensus Conference. Aliment Pharmacol Ther 2010; 31:166.