Best Poster Award

Topic: 1. Clinical Cardiology

Effects of Pharmacotherapy for Smoking Cessation on LOX Index, a Cardiovascular Risk Marker

Maki Komiyama,¹ Hiromichi Wada,¹ Hajime Yamakage,¹ Noriko Asahara,¹ Sayaka Shimada,¹ Masaharu Akao,¹ Tatsuya Morimoto,² Yuko Takahashi,¹ Tatsuya Sawamura,³ Koji Hasegawa¹

1. National Hospital Organization, Kyoto Medical Center, Japan, 2. School of Pharmaceutical Sciences, University of Shizuoka, Japan,

3. Department of Physiology, Shinshu University, Nagano, Japan

Keywords: Smoking Cessation; LOX Index; Inflammation; Atherosclerosis

Introduction and Objectives

Vessel wall inflammation promotes the destabilization of atherosclerotic plaques. The lectin-like oxidized low-density lipoprotein (LDL) receptor-1 (LOX-1) expressed by vascular cells and monocytes. LOX index is calculated by multiplying LOX-1 ligand containing apolipoprotein B level with the soluble LOX-1. A high LOX index reflects an increased risk for stroke and myocardial infarction. However, the change in LOX index after smoking cessation and the relationship between smoking-related variables and LOX index is unknown. Additionally, epidemiologic studies report that there is a possibility that the risk of cardiovascular events may increase during treatment with varenicline, and some alarm bells for smoking cessation using varenicline as a smoking cessation aid in patients with cardiovascular disease. However, the exact details are unknown. The present study investigated the change of cardiovascular risk marker, LOX index, after smoking cessation and the relationship between smoking-related factors and LOX index. In addition, the present study investigated the impact of smoking cessation as well as the effects of a smoking cessation aid on the LOX index.

Materials and Methods

A prospective study was conducted on patients who consulted the Smoking Cessation Clinic. Varenicline or nicotine patch were used as a smoking cessation aid. Relation of the clinical parameters to the LOX index was examined on 207 subjects (155 males and 52 females) at the first visit to our outpatient clinic for smoking cessation. Various parameters including LOX index were evaluated at 12 weeks after beginning a smoking cessation therapy in the 94 subjects (62 males and 32 females) who successfully stopped smoking. The subjects who successfully quit smoking were divided into two groups based on the rate of BMI increase to investigate

the influence of BMI increase on a cardiovascular risk marker. The effects of a smoking cessation aid on the LOX index were also determined.

Results

Sex-adjusted regression analysis and multivariate analysis identified three independent determinants of the LOX index, namely low-density lipoprotein-cholesterol (LDL-C; $\beta = 0.273$, $p = 0.002$), high-sensitivity C-reactive protein ($\beta = 0.324$, $p < 0.001$), and expired carbon monoxide concentration reflecting smoking heaviness ($\beta = 0.225$, $p = 0.008$). Body mass index (BMI) significantly increased 3 months after the onset of smoking cessation ($p < 0.001$). However, the LOX index significantly decreased from baseline to 3 months (from 3.31 to 2.57; $p < 0.001$), regardless of the rate of increase in BMI post-cessation. There was no significant difference in the degree of change in the LOX index between patients who were prescribed varenicline and those were prescribed nicotine patch.

Conclusions

The findings suggest that the LOX index is closely related to smoking heaviness, a marker of dyslipidemia (LDL-C), and a marker of inflammation (hsCRP). A significant decrease in LOX index was detected within 3 months after smoking cessation, which might reflect a reduction in cardiovascular risk at an early stage. In addition, a significant decrease in LOX index was noted even in subjects exhibiting larger weight gain after smoking cessation, regardless of the type of prescription drugs. Thus, the LOX index may constitute a sensitive marker of smoking status, rather than just a marker of weight gain. ■

1. Sawamura T, Wakabayashi I, Okamura T (2015) LOX-1 in atherosclerotic disease. *Clin Chim Acta* 440: 157-163.