

Serum Small Dense Low-density Lipoprotein Concentrations are Elevated in Patients with Significant Coronary Artery Stenosis and are Related to Features of the Metabolic Syndrome

Shima Yazdandoust · Seyyed Mohammad Reza Parizadeh · Mohsen Moohebbati · Parichehreh Yaghmaei · Amir Ali Rahsepar · Shima Tavallaie · Mohammad Soukhtanloo · Roshanak Khojasteh · Roghayeh Paydar · Afsoon Fazlinezhad · Homa Falsoleiman · Mashalla Dehghani · Majid Ghayour-Mobarhan · Gordon A. Ferns

Received: 17 February 2012 / Accepted: 30 July 2012 / Published online: 18 August 2012
© AOCs 2012

Abstract Serum small dense low-density lipoprotein (sd-LDL) concentrations were measured in patients with angiographically defined coronary artery disease (CAD) and compared to concentrations in healthy subjects. Five hundred and seventy patients with stable CAD were divided into CAD⁻ and CAD⁺ based on angiography. Patients in whom stenosis was <50 % in diameter were classified as having a ‘normal’ angiogram (CAD⁻), otherwise the patients were allocated to the CAD⁺ group. The CAD⁺ group was further subcategorized into single-, double- and triple-vessel disease (VD). Serum sd-LDL concentrations were significantly lower in controls compared with CAD⁺ and CAD⁻ patients ($P < 0.001$). Moreover, CAD⁺ patients had higher concentrations of sd-LDL than

CAD⁻ patients ($P < 0.01$). sd-LDL levels were not significantly associated with severity of CAD defined by the number of stenosed coronary arteries ($P = 0.245$). All participants were also categorized into subgroups with or without metabolic syndrome. Subjects with metabolic syndrome had higher levels of sd-LDL than subjects without metabolic syndrome ($P < 0.01$). Multiple linear regressions showed that in CAD patients, triacylglycerol, total-cholesterol, body mass index, and waist circumferences were the most important determinants of serum sd-LDL concentrations. We found that sd-LDL levels were significantly higher in patients presenting with symptoms of CAD. Moreover, patients with significant stenosis of their coronary arteries (>50 % stenosis) had higher levels of sd-LDL compared to patients without significant lesions.

Keywords Small dense low-density lipoprotein · Coronary artery disease · Severity · Metabolic syndrome · Angiography

S. Yazdandoust · P. Yaghmaei
Department of Biology, Faculty of Basic Sciences, Science Research Campus of Islamic Azad University, Tehran, Iran

S. Yazdandoust · S. M. R. Parizadeh · A. A. Rahsepar · S. Tavallaie · M. Soukhtanloo · R. Khojasteh · M. Ghayour-Mobarhan (✉)
Faculty of Medicine, Biochemistry of Nutrition Research Center, Mashhad University of Medical Science, Mashhad, Iran
e-mail: ghayourm@mums.ac.ir

M. Moohebbati · A. A. Rahsepar · S. Tavallaie · R. Paydar · A. Fazlinezhad · H. Falsoleiman · M. Dehghani · M. Ghayour-Mobarhan
Faculty of Medicine, Cardiovascular Research Center, Mashhad University of Medical Science, Mashhad, Iran

G. A. Ferns
Faculty of Health, Institute for Science and Technology in Medicine, University of Keele, Staffordshire, UK

Abbreviations

AHA/NHLBI	American Heart Association/National Heart, Lung and Blood Institute
ANOVA	One-way analysis of variance
BMI	Body mass index
CVD	Cardiovascular disease
CAD	Coronary artery Disease
FBG	Fasting blood glucose
HDL-C	High density lipoprotein cholesterol
hs-CRP	High sensitive C-reactive protein
MS	Metabolic syndrome
Sd-LDL	Small-dense low-density lipoprotein
SPECT	Single photon emission computed tomography
SVD	Single vessel disease