LiSS Life Safety and Security

open access

Healthcare safety

Perspective article

CARDIOVASCULAR RISK AND SAFETY: AN UPDATE ON THE METABOLIC SYNDROME INCLUDING THE ROLE OF NAFLD, NASH AND ATHEROGENIC LIPOPROTEINS IN ITS PATHOGENESIS

Manfredi Rizzo, MD, PhD[1,2], Giuseppe Montalto, MD[2,3]

[1]Euro-Mediterranean Institute of Science and Technology, Palermo, Italy
[2]Biomedical Department of Internal Medicine and Medical Specialties, University of Palermo, Italy
[3]Institute of Biomedicine and Molecular Immunology "Alberto Monroy", National Research Council (CNR), Palermo, Italy

Correspondence:
Manfredi Rizzo
e-mail: manfredirizzo@iemest.eu

Received: March 2nd, 2015
Revised: March 23rd, 2015
Accepted: March 24th, 2015

The metabolic syndrome (MetS) is a cluster of abnormalities including abdominal obesity, glucose intolerance, hypertension and dyslipidaemia, factors that are all associated with an increased cardiovascular (CV) risk [1]. However, the CV risk is greater than what is expected from the individual diagnostic components. In addition, in the past decade there has been a marked increase in the prevalence of the MetS in Europe and the United States. Yet, the exact pathogenesis of the MetS remains debatable, as well as the crucial factors (mediators) linked to the elevated CV risk. Indeed, cardiovascular disease (CVD) still represents the leading cause of death worldwide. Although guidelines emphasize the need of tight control of CV risk, current approaches for prevention and treatment of CVD are not completely effective in terms of risk reduction, even when using a number of combined strategies. Therefore, there is a need for new treatments and identification of novel biomarkers of CVD risk for subjects with the MetS [1,2].

Increasing evidence suggest that the "quality" rather than only the "quantity" of plasma lipids and lipoproteins is strongly associated with cardiovascular risk. Low-density lipoproteins (LDL) are very heterogeneous particles, which differ in physical-chemical composition, metabolic properties, oxidative potential as well as atherogenicity [1]. Seven distinct LDL subclasses can be distinguished, being the smaller, more dense subspecies the most atherogenic. Several expert panels and international guidelines, such as the National Cholesterol Education Program Adult Treatment Panel III, have accepted the predominance of small, dense LDL as an emerging cardiovascular risk factor. Most studies suggest that measuring LDL particle size, small, dense LDL cholesterol content, and LDL particle number provides additional assessment of CV risk. Therapeutic modulation of LDL size, number, and distribution can also decrease cardiovascular risk [1]. A European panel of experts recently provided a comprehensive consensus statement on the pathophysiology, atherogenicity and clinical significance of LDL subclasses [3].

Non-alcoholic fatty liver disease (NAFLD) can be seen as the result of an imbalance between lipid availability and lipid disposal resulting in hepatic steatosis [2]. NAFLD is considered by many as the hepatic manifestation of insulin resistance and is strongly associated with the metabolic syndrome. The rapid increase in obesity and type-2 diabetes during the last decade is associated with an increase in the prevalence

of NAFLD, making it the most common cause of chronic liver disease in the Western countries with up to 30% of the population affected [2]. Histological evaluation is the gold standard for precisely estimating the degree of liver damage caused by simple steatosis or by non-alcoholic steatohepatitis (NASH). NASH is a disturbance at the end of NAFLD spectrum characterized by hepatocellular injury/ballooning/macrophage infiltration with or without fibrosis [2]. The individuals with NAFLD develop NASH in 10% of the cases, 8-26% progress to cirrhosis and these patients are also at risk of developing hepatocellular carcinoma. As highlighted by the guidelines of the American Association for the Study of Liver Diseases, patients with NAFLD and NASH are at increased risk for cardiovascular disease (their most common cause of death). Therefore, patients with NAFLD and NASH should be stratified for such risk and their CVD factors, including dyslipidemia, should be managed accordingly [4].

References

1. Nikolic D, Katsiki N, Montalto G, Isenovic ER, Mikhailidis DP, Rizzo M. Lipoprotein Subfractions in Metabolic Syndrome and Obesity: Clinical Significance and Therapeutic Approaches. Nutrients 2013;5:928-948.

2. Rizzo M, Montalto G, Al-Rasadi K. Treatment options for managing atherogenic dyslipidemia and fatty liver disease. Expert Opin Pharmacother 2014;15:1065-8.

3. Mikhailidis DP, Elisaf MS, Rizzo M, Berneis K, Griffin B, Zambon A, Athyros V, de Graaf J, März W, Parhofer KG, Rini GB, Spinas GA, Tomkin GH, Tselepis AD, Wierzbicki AS, Winkler K, Florentin M, Liberopoulos EN. "European Panel on Low Density Lipoprotein (LDL) Subclasses": A Statement on the Pathophysiology, Atherogenicity and Clinical Significance of LDL Subclasses. Curr Vasc Pharmacol 2011; 9:533-571.

4. Montalto G, Rizzo M, Mikhailidis DP. Editorial: Managing the Cardiovascular Risk Associated with the Metabolic Syndrome. Curr Pharm Des 2014;20:4941-43