

## Editorial

### Modifying Cardiovascular Risk Factors: Acquired Topics and Emerging Concepts

Cardiovascular risk factors play a significant role in influencing heart and blood vessel disease by updates that can confirm or modify from time by the time the acquired results. Indeed, the number and effects of these factors undoubtedly change the epidemiological survey of cardiovascular disease with regards to its onset, progression, and prognosis. So, when the relationship between coronary risk factors and atherosclerosis, which is the most important “picture” of disease, is analyzed, several interesting papers clearly show not always similar results [1-6] partly due to different experimental protocols and partly to the role of pathologically changed impact on the structures affected.

It is worth noting that epidemiological survey uses statistical estimates to assess the significance of cardiovascular risk factors in inducing heart and blood vessel disease. In addition, evidence indicates that statistical methods play a basic role in identifying the quality and health problems monitoring the main characteristics related to the improvement or worsening of clinical and pathological outcomes.

Epidemiology has developed more from the perspective of disease than from that of public health. This is probably a result of the fact that the episodes of disease affecting individuals rather than the state of health of the population are clearly prevailing in medical findings. Biological, as well as methodological knowledge is usually required, and this should be found in the groups of individuals suffering from a similar disease analyzing statistical results. Thus, there is an epidemiological and statistical potential in the prevention and a challenge in bringing the development of epidemiological theory and methods able to clearly evaluate public health problems avoiding false expectations, which are, however, a major existing obstacle to prevention. In addition, false expectations should be considered when previously acquired data meet emerging new perspective. So, cardiovascular risk factors need undoubtedly to be carefully recognized in the context of heart and blood vessel disease, analyzing the results obtained from several studies as well as what is in change or progress. The last results, when clearly proven by statistical and epidemiological estimates, should be taken into account.

It is worth noting that among the stably acquired data, morpho-pathological observations influenced by some cardiovascular risk factors, primary hypertension, cigarette smoking and metabolic disorders of lipids and glucose have been clearly documented [7-10]. However, it is worth noting that structural lesions belong to the specific disease analyzed even when cardiovascular risk factors are lacking.

Myocardial infarction and coronary atherosclerosis [11-13], the most dramatic cardiovascular occurrence, usually show severe alterations of myocardial cells and coronary arteries in both human and animal studies, mainly consisting of myocardial necrosis, structural intracellular lesions, which are similar to those that characterize the experimental cardiomyopathy, and coronary artery narrowing due to atherosclerotic plaque formation often complicated by rupture and thrombus-embolism. The lesions observed are more severe in those individuals affected [1], who are continuing smokers, because of the toxics of tobacco and lit cigarette, primarily nicotine and carbon monoxide. Thus, tobacco smoke is clearly documented to be one of the major cardiovascular risk factors able to damage the heart and blood vessels. In addition, carbon monoxide [4, 6] has been demonstrated to be the most toxic compound of cigarette smoking because of its chronic effects primarily on blood pressure and ischemic heart disease. An increase in systolic blood pressure, often accompanied to clinical and/or pathological signs of coronary alterations, was documented [11] in dated smokers when they were compared to discontinuing smokers and never smokers.

Cardiovascular damage related to metabolic factors recognizes clearly established topics depending on pathological characteristics, primarily associated with atherosclerosis as an effect of LDL-Cholesterol increase, although continuously updating observations may be the result of changes in the steps of the chemical reactions particularly associated with diabetes mellitus and metabolic syndrome [14].

Arterial hypertension [15-18] should be included among the risk factors showing data completely defined as the pathological alterations of arterial vessels are, and emerging concepts primarily related to the treatment and preventive measures [1]. The main features of the arterial system in essential hypertension include small and large artery remodeling, with associated functional changes. The structural changes of small arteries involve the microcirculation with organ pathology. They lead to an increase of vascular resistance, exaggerate the vasoconstrictive response to various agents, and impair the autoregulation of blood flow to organs. On the contrary, large artery pathology is variably associated with remodeling and increased stiffening, depending on the arterial site. These changes usually determine clinically an increase in systolic blood pressure. Among the emerging concepts, which characterize arterial hypertension, there is evidence that they will change continuously in the time their role since pharmaceutical industry produces large numbers of anti-hypertensive drugs, sometimes with no effective result in the treatment of the essential hypertension, to marketing purpose.

A topic to be still developed and, consequently, needs more careful assessment is how the environment can influence cardiovascular risk factors because currently they can change and/or modify the usual responses.

The environment is usually defined as a complex structure with indoor and outdoor spaces where humans live and regulate their lifestyle and habit. There is evidence that living beings have dramatically changed the course of the natural phenomena.

Several studies [5, 19-21] identified a clear role of environmental factors, able to influence and modify the outcome of cardiovascular disease primarily ischemic heart disease and hypertension. These pathological conditions usually met an impairment that is more evident in the older population. The observations reported by these papers on the subject allowed conclusions that environment, particularly because of pollution due to chemical industries, could directly harm cardiovascular system and determine also the development of infectious disease due to bacteria and protozoa with heart tropism in some geographical areas. These are located in the central Africa, east-Asia and South-America.

Beside the data acquired on the role of some cardiovascular risk factors, which mainly involve morphological pathology of the heart and blood vessels, there are others, moreover recognized, which are characterized by progresses in their effects as a result of the emerging concepts. The type of damage together with identifying new risk factors, which needs to be assessed with regards to the effects able to influence cardiovascular events, are parameters closely associated with newer data to be interpreted.

With regards to metabolic factors, evidence indicates that metabolic syndrome and obesity continuously are updated by findings that show emerging concepts [22-24]. The net effects of the gut microbiome on energy balance, a parameter that should be carefully monitored in the obese population, seem to identify newer mechanisms, still to be completely assessed, that might contribute to cardiovascular damage.

The prevalence of marked obesity is increasing rapidly among adults [25-27] and has more than doubled in the last 10 years. Sixty-one percent of the adult population of the United States is overweight or obese. Paradoxically, the increase in the numbers of persons who are

obese or overweight have occurred during recent years, although Americans have followed numerous dietary programs, diet products, weight control, health clubs, home exercise equipment, and physical fitness.

However, evidence indicates that overweight and obesity are also a world health problem. The World Health Organization estimates that 1 billion people around the world are now overweight or obese and that was mainly depending on the Westernization of the diets. Fruits, vegetables, and whole grains are being replaced by readily accessible foods high in saturated fat, sugar, and refined carbohydrates with still no satisfactory results.

It is worth noting that obesity associated with metabolic syndrome is the most severe health complications, and, therefore, the incidence of hypertension, stroke, heart disease, diabetes, and peripheral vascular disease will increase substantially in the future. Recently, obesity alone has been implicated in the development of cardiac hypertrophy and chronic heart failure [27]. In addition, the metabolic syndrome associated with abdominal obesity, which includes insulin resistance, dyslipidemia, and elevated glycemic levels, identifies subjects who have an increase in cardiovascular morbidity and mortality.

Diagnostic devices and imaging techniques to study heart metabolism and blood flow in baseline conditions and in the presence of alterations are currently in progress. They, consequently, provide a more satisfactory approach to interpreting the real effects of risk factors on the cardiovascular system [28-30]. An impressive gain in the development of these methods, undoubtedly, may improve the knowledge on the role and damaging mechanisms of cardiovascular risk factors, primarily at a metabolic level.

Imaging techniques [31-33] seem to be more and more an integral part of clinical cardiology. With the new realities in health care emphasizing quality and cost-effectiveness, future technologies will need to demonstrate value through greater efficiency and efficacy of care and/or patient outcomes [33]. A greater emphasis will be placed on appropriate utilization of technology and resources, including imaging. There is evidence that the progress in imaging studies is the basis to avoid planning of multiple tests in study patients. Therefore, both cost and safety in the context of patient-care continuously will emerge permitting to identify the best approaches to disease detection and management with a focus on providing the best care to the patient as well as a precise quantification of some cardiovascular risk factors.

In conclusion, a dynamic pathway, still to be clearly interpreted, characterizes cardiovascular risk factors and, therefore, continuously emerging concepts may be taken into account in assessing cardiovascular epidemiology and associated preventive measures for a correct approach to the role that cardiovascular risk factors exert on the development of heart and blood vessel disease. Starting from this assumption, the future observations related to this field of cardiovascular pathology could be re-written, since several points of view should be variably interpreted and more probably changed in the role and significance according to the newest results provided by the epidemiological survey and statistical approach linked to the development of the research.

There is evidence that despite of a great number of findings emphasizing the cardiovascular damage, to whom cardiovascular risk factors contribute, debated opinions on the mechanisms and role of them still exist primarily with regards to the type, reproducibility, onset, and progression of the alterations caused. These discrepancies can be partly removed when emerging concepts will be clearly established in their true context, and, therefore, the expected progresses in the control of risk factors are still far to be obtained.

This behavior is suggested by a very recent report of the Interassociation Consensus Statement on Cardiovascular Care of College Student-Athletes [34], who analyze the main risk of sudden cardiac death in young athletes. Cardiac arrest during training and sports participation is a leading cause of unexpected deaths and post-arrest disabilities athletes. The risk of sudden cardiac death is higher in male and African-American athletes and appears to be disproportionately high in men's basketball players. Cardiovascular screening in athletes should include a standardized personal and family history, physical, and instrumental examination. Secondary testing of screening abnormalities and management by identifying cardiac disorders including cardiovascular risk factor prevention should be carried out in consultation with skilled cardiovascular specialists. Thus, this assumption further recognizes needing to carefully assess both old and emerging risk factors for the heart and blood vessels.

Finally, a concept to be taken into account in understanding the trends of cardiovascular disease and, consequently, the role of cardiovascular risk factors, primarily with regards to their assessment or emerging data is knowledge of the epidemiological transition [35-36].

Epidemiological transition recognizes a complex and dynamic course [37], which is characterized by different pathways in the trends of cardiovascular disease and underlying risk factors. Thus, evidence indicates that a decline in infant and child mortality due to the development of new drugs and preventive measures with a gain in longevity may be made up for the appearance of cardiovascular disease, which affect particularly the elderly. It is worth noting that this fact undoubtedly influence the role of risk factors, which may meet changes in their characteristics and epidemiologic and statistical estimates.

The aim of this issue is to focus on the main characteristics up to now established with regards to major cardiovascular risk factors either as they are or how clinical, diagnostic, and pathologic events may influence their course as well as the emerging concepts that recent findings permit to identify. The reviews included in this issue [38-47] actively contribute to achieve the scientific knowledge on the role of external factors, as climate and its related events, ischemic heart disease including hypertension and acute myocardial infarction, metabolic factors with the primary consideration of homocysteine and gut microbiota as well as the main investigations obtained by multimodal imaging techniques.

**Keywords:** Cardiovascular risk factor(s), Coronary artery disease, Myocardial Infarction, Homocysteine, Marker(s) of cardiovascular damage, Collagen metabolism, Gut microbiota, Magnetic Resonance Imaging, Hypertension, Heart Failure, Climate changes.

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