

# Systemic Hemodynamic Atherothrombotic Syndrome: A New Concept in Cardiovascular Risk Assessment

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**Received:** March 04, 2022    **Published:** March 16, 2022

**Keywords:** Systemic Hemodynamic Atherothrombotic Syndrome, Cardiovascular Diseases, Heart Disease Risk Factors, Arterial Pressure, Blood Pressure

## To the Editors,

Cardiovascular diseases remain the leading cause of death globally, and one of the major groups of diseases with the highest health care costs in terms of therapy, rehabilitation, disability and incapacity [1]. The burden of disease they generate is worrying, since they occur at increasingly younger ages, which has prompted the development of cardiovascular risk scales and increasingly systematic evaluations to determine the risk of disease and life prognosis in the short-, medium- and long-term [1]. Traditional risk factors, such as diabetes mellitus, arterial hypertension, dyslipidemia, smoking, male sex, among others, and also some non-traditional risk factors such as proteinuria, left ventricular hypertrophy, anemia or prothrombotic states, are commonly used to determine cardiovascular risk in the population [2]. However, evidence-based medicine aims at the continuous identification and assessment of emerging concepts that may impact on the intervention effects of diagnostic methods, therapeutic plans and prognostic tools.

A new concept has recently been described that substantially influences the dynamics of blood pressure variability, established cardiovascular disease and major cardiovascular events; the systemic hemodynamic atherothrombotic syndrome (SHATS) [3-6]. This concept is based on a hypothesis called "resonance hypothesis of blood pressure variability" [6], which states that sudden changes in blood pressure caused by a neuroendocrine disorder due to exposure to environmental factors (time of day, seasons, atmospheric differences, distress, etc.) and silent organic factors (e.g., undiagnosed genetic disorders or resolved history of cardiometabolic disorder during childhood), cause persistent lesion at the level of large vessels, medium vessels and microvasculature, generating endothelial dysfunction and atherosclerotic disease, thus establishing a vicious cycle [6]. The older the age, the greater the impact of SHATS and the greater the risk of triggering cardiovascular events, due to vascular aging and the addition of both traditional and non-traditional cardiovascular risk factors [3,5]. However, phenotypes such as sudden morning or nocturnal elevation of systolic blood pressure have been described as the first manifestation of SHATS, which can occur even in young people without traditional risk factors [7,8]. Such is the popularity of this new pathophysiological concept that it has been associated with pathological conditions such as obstructive sleep apnea [7] and dementia, or pathophysiological mechanisms such as heart and blood vessel disease [4].

This pathological description is part of an international program of cardiovascular prevention in Asia [9], with the objective of effectively and safely controlling arterial hypertension and evaluating whether it is necessary to start pharmacological treatment or strict follow-up in new risk groups, since they recognize that it is a concept that modifies the cardiovascular risk and the outcomes in the management of hypertensive patients [9]. Diagnostic and severity scales have been proposed [10]. However, it is necessary to create evidence of the best quality to define cut-off scores and to demonstrate the relevance of this concept at a global level, so that it can be definitively included in the design of clinical policies through clinical practice guidelines. But for this, it is necessary to understand SHATS and the impact it has on cardiovascular disease at both the molecular and systemic levels [3,5,10].

It is a pathophysiological description that has biological plausibility and theoretically has the potential to adversely modify the cardiovascular risk of those exposed to certain risk factors, even early in life, compromising the functional capacity and survival of the population [3-6]. Therefore, it is urgent to take it into account in the reevaluation of scales and diagnostic methods for cardiovascular risk and disease. To date, only a few authors have published on this subject. However, in the near future, it will probably be officially considered as a traditional or non-traditional emerging risk factor.

## Funding

None.

## Conflicts of Interest

None

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**Citation:** Nuñez-Gamez JA, Bayona-Gazabón S, Villaveces-Buelvas S, Burgos-de Moya LA, Ortega-Sierra MG. "Systemic Hemodynamic Atherothrombotic Syndrome: A New Concept in Cardiovascular Risk Assessment". *SVOA Neurology* 3:2 (2022) Pages 66-67.

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