ARTIGO DE REVISÃO
REVIEW ARTICLE

NEW RISK FACTORS FOR HYPERTENSION

NOVOS FACTORES DE RISCO PARA A HIPERTENSÃO

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Abstract
A new perspective on hypertension has emerged, recognizing it as a multifactorial condition influenced by inflammation, pollution, and social factors like poverty, stress, and sleep disturbances. These elements are acknowledged in recent hypertension guidelines and impact the management of this common condition. We aim to summarize the updated knowledge on these new risk factors for hypertension.

Palavras-Chave:
Fatores de Risco para Hipertensão, Sono, Luz, Poluição, Depressão, Exclusão Social

Resumo
Uma nova abordagem para a gênese da hipertensão arterial inclui fatores como inflamação, poluição, pobreza, stress no trabalho e distúrbios do sono. Esses fatores agora são reconhecidos nas diretrizes mais recentes de hipertensão arterial e são essenciais para entender e gerenciar esta doença complexa. O nosso objetivo é resumir o conhecimento atualizado sobre esses novos fatores de risco para a hipertensão arterial.

Readers of this publication understand Cardiovascular Risk Factors. For arterial hypertension, the known risk factors include excessive salt consumption, obesity, and smoking among modifiable ones, as well as age and genetic inheritance among non-modifiable "classic" CVRFs. This text focuses on recent evidence of this "new" understanding, of importance in everyday clinical practice. Over the past 20 years, the list of new cardiovascular risk factors has been growing steadily. This is attributed to two main reasons: an increased understanding of the detailed pathophysiology of arterial endothelial dysfunction and hypertension and lifestyle changes brought about by modern living and rapid climate changes. These factors are acknowledged for the genesis of hypertension in recent guidelines (1,2).

It is now known that inflammatory mechanisms play a role in all cardiovascular diseases, from atherosclerosis to hypertension and heart failure (see figure 1).

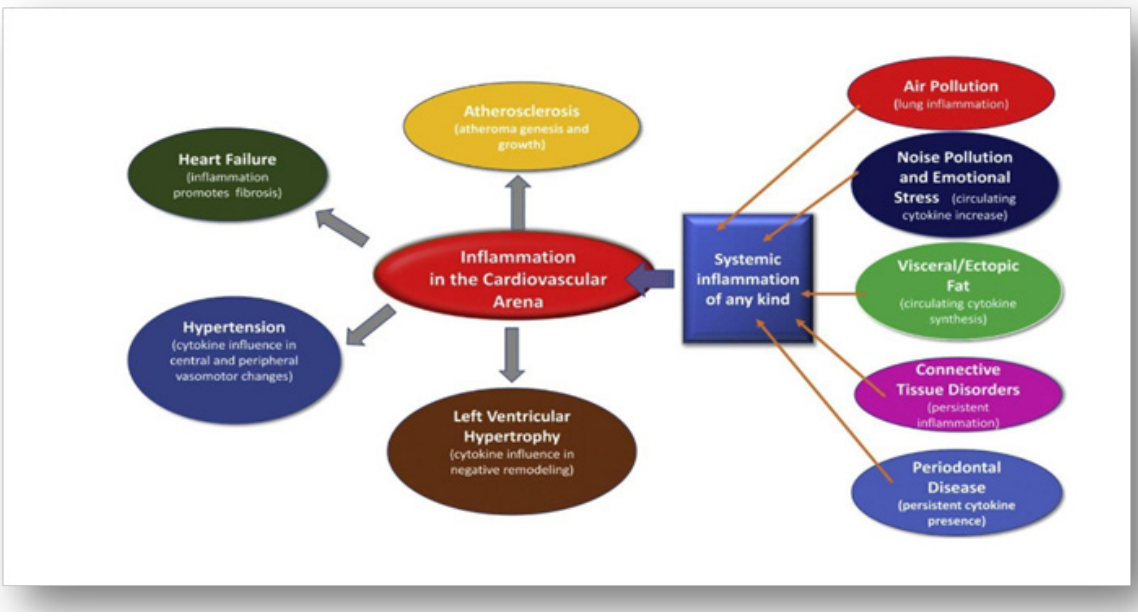

Figure 1: Inflammation in the cardiovascular context. It plays a role in the development and progression of atherosclerotic disease, arterial hypertension, left ventricular hypertrophy, and heart failure. Inflammation also explains the connection between these conditions and new cardiovascular risk factors (pollution, ectopic fat, connective tissue diseases, and periodontal disease). Adapted from Bronze, L (3).

Given this situation, generic inflammatory risk factors are now recognized as important in hypertension, such as the presence of any chronic inflammatory disease, which can worsen cardiovascular disease through a crossover mechanism. Any inflammatory condition can contribute to inflammatory vascular endothelial dysfunction, especially through the systemic sharing of inflammatory markers (4). Thus, chronic inflammatory diseases, particularly osteoarticular and common periodontal disease, are now included in the list of new hypertension risk factors (5). Additionally, adipose tissue, especially ectopic adipose tissue (not located in subcutaneous tissue), is a significant producer of inflammatory markers and should be valued in this context (5).

Recently, numerous authors have highlighted additional risk factors. These include environmental risks such as air pollution, noise pollution, and light pollution, collectively referred to as the "Exposome" (6). Psychosocial factors, including psychiatric illness, loneliness, poverty, and sleep, are becoming increasingly significant. Some factors intersect with social elements, such as poorer individuals living in areas with significant air pollution and/or holding jobs exposed to higher noise pollution (7–10).

Air pollution creates ongoing respiratory inflammation, which can worsen vascular inflammation. Noise pollution activates the Hypothalamus-Pituitary-Adrenal (HPA) axis, leading to continuous cortisol release by the adrenal gland and constant activation of the Autonomic Nervous System, particularly its adrenergic component (dependent on the Sympathetic component). This sympathetic hyperactivity is very important in the genesis of so-called essential or primary hypertension, both peripherally and renally.

Light pollution, predominant in cities, disrupts hormonal mechanisms associated with the circadian rhythm and is associated with sleep disturbances, which are also strong potentiators of sympathetic activation and consequent increase in cardiovascular risk. We know that sleeping less than 6-8 h increases cardiovascular risk, but sleeping more than 8 hours also carries risks, especially if we associate it with napping(12,13) (see figure 2). It is estimated that sympathetic activation and hypertension are important in the increased cardiovascular risk of sleep disturbances.

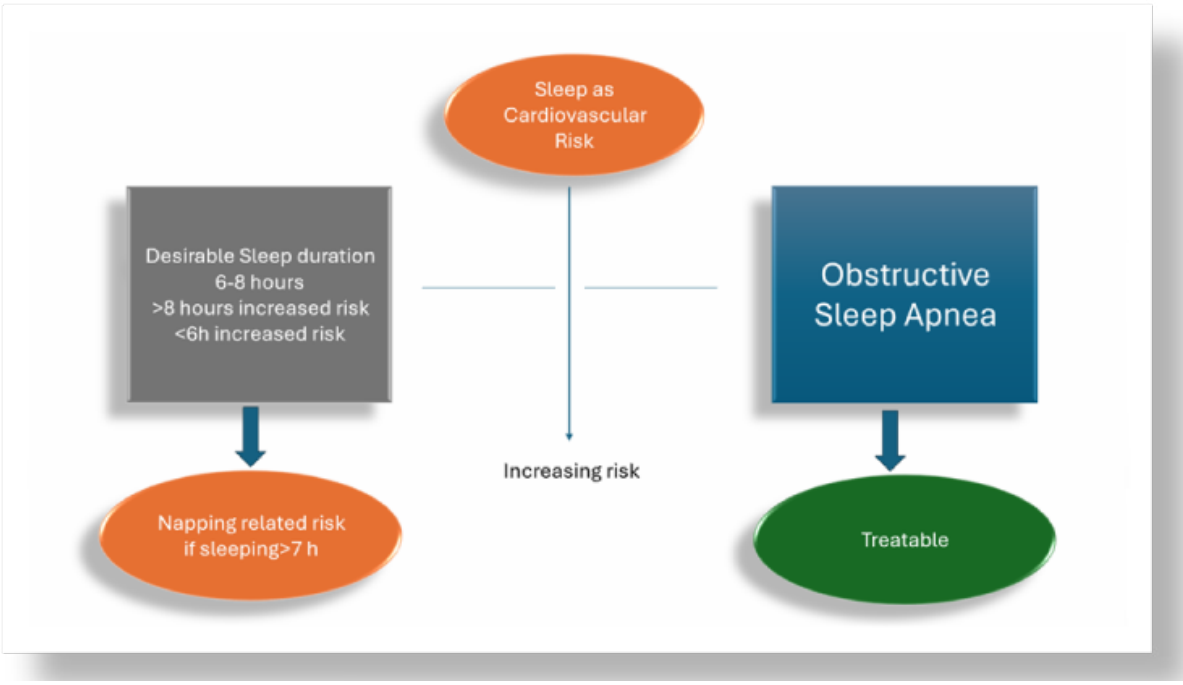

Figure 2: The risk of sleep: sleeping between 6 and 8 hours is ideal. Sleeping more carries an increased cardiovascular risk, especially for those who sleep 8 hours or more and nap. Obstructive Sleep Apnea is also associated with hypertension.

Obstructive Sleep Apnea has also been associated with sympathetic overstimulation and Hypertension(14). The treatment is certainly well-known and entails the use of non-invasive ventilation(1,15)

Psychiatric disorders, such as depression, are also associated with a strong increase in cardiovascular risk, with sympathetic activation and vasomotor changes being admitted as the main inducers of Hypertension(16). Other situations associated with so-called "modern" life, especially maladjustment and permanent anxiety(17), are also considered hypertension risk factors today. Thus, stress in the workplace has arisen as a very important risk factor. In the same group are now included Post-Traumatic Stress Disorder and simple social isolation/loneliness(17). It is known, for example, that living in loneliness(18,19) is associated with an increased risk of Stroke(20).

The reader should understand that many of these new risk factors cannot be prevented by health agents or medical actions alone. Other societal agents—political, administrative, and economic—must contribute, as seen during the pandemic. Doctors should actively promote healthy cities and environments. Cardiovascular Societies must emphasize public intervention to address these new risk factors. We should focus on primordial prevention, often beyond our control as clinicians. The new risk factors are summarized in table 1.

Table 1- New Risk factors for Hypertension – important messages

Category	Details
Overview	Inflammatory mechanisms play a role in all cardiovascular diseases, including atherosclerosis, hypertension, and heart failure. Chronic inflammatory diseases are recognized as risk factors for cardiovascular diseases.
Inflammatory Risk Factors	Chronic inflammatory diseases (e.g., osteoarticular and periodontal disease). Ectopic adipose tissue is a producer of inflammatory markers.
Environmental and Psychosocial Risk Factors	Air pollution: Causes respiratory inflammation and worsens vascular inflammation. Noise pollution: Activates the HPA axis, leading to sympathetic overactivity and hypertension. Light pollution: Disrupts circadian rhythm and causes sleep disturbances. Psychosocial factors: Includes psychiatric disorders, loneliness, poverty, and sleep issues.
Key Points	Air and noise pollution are strong triggers for hypertension. Light pollution and sleep disturbances increase cardiovascular risk. Psychiatric disorders and stress are significant cardiovascular risk factors. Societal intervention is needed for effective prevention of these risk factors.
Recommendations	Promote healthy cities and environments. Focus on primordial prevention beyond medical actions. Public intervention is essential to address new cardiovascular risk factors.

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