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Hypertension and hypertensive retinopathy: Diagnosis, treatment, and prevention

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ABSTRACT

INTRODUCTION: Hypertension (SAH) is a chronic disease whose incidence increases significantly with age, representing an important public health problem in Brazil. Hypertension is associated with several complications, such as cardiovascular diseases and hypertensive retinopathy, which increase treatment costs and reduce patients' quality of life. Risk factors such as obesity, sedentary lifestyle, high-sodium diet, excessive alcohol consumption, and family history contribute to the development of the disease. Discussing the subject is essential to promote awareness about the prevalence and control of the disease, as early diagnoses can significantly reduce the risk of developing complications. **METHODS:** The present study conducted a comprehensive evaluation of the existing literature on the relationship between hypertension and hypertensive retinopathy. The research used scientific publications and literature reviews as the main sources of information. These sources were accessed through renowned databases, such as Pubmed, Scielo, LILACS, and MedLine. The search was carried out using the descriptors "diabetic retinopathy" and "arterial hypertension". In addition, a total of ten articles were selected in the period from 2019 to 2024. **DISCUSSION:** In this study, it can be observed that Hypertensive Retinopathy (RH) is directly related to blood pressure control, thus evidencing the importance of effective management of hypertension. Among the hypertensive patients evaluated, 23% had signs of RH, while in normotensive patients the prevalence was 2.64%. In addition, among hypertensive patients with uncontrolled blood pressure, 25.3% had retinopathy, compared with 12.2% of patients with controlled hypertension ($p<0.01$). The prevalence of RH was higher in individuals over 60 years of age (36.02%), with a higher risk observed in black patients (OR=1.67) and in those who did not follow adequate treatment. Thus, RH develops from structural changes in the retinal vessels induced by high blood pressure. In addition, arteriolar vasoconstriction mediated by myogenic and metabolic mechanisms occurs, followed by increased vascular permeability, which results in edema and plasma extravasation in the retina. In addition, the progression of the condition includes sclerosis of the retinal arterioles, leading to the formation of "copper wires" and "silver wires", characteristic of the advanced phase of the disease. In severe cases, complications such as retinal hemorrhages, papilledema, and vascular occlusions are observed. In addition, the diagnosis of RH is made based on a fundus examination, using the Keith-Wagener-Barker (KWB) classification, which divides retinopathy into four progressive stages: from mild narrowing of the retinal arterioles (Group I) to the presence of papilledema (Group IV), which represents a severe ophthalmologic condition associated with higher cardiovascular mortality. It was also possible to observe that the more advanced stages (Groups III and IV) were predominant in patients with long-standing and uncontrolled hypertension, suggesting a direct correlation between the severity of hypertension and the extent of retinal lesions. Thus, direct ophthalmoscopy fundus examination proved to be an effective tool in early screening for RH, especially in patients with risk factors, such as uncontrolled hypertension and diabetes mellitus. In summary, the results highlight the need and importance of strict blood pressure control and regular ophthalmologic follow-up in hypertensive patients, especially those with risk factors, such as diabetes and advanced age. Finally, early identification of adverse conditions, by eye examination, can contribute to the prevention of more serious complications, such as irreversible visual loss. Systemic arterial hypertension (SAH) is a

significant risk factor for several health complications, including eye injuries such as hypertensive retinopathy (RH). This article addresses the importance of proper blood pressure (BP) management, the complications associated with SAH, and the relevance of early diagnosis, with a focus on vascular irregularities and the impact of hypertension on health Tight BP control is crucial, especially in patients with conditions such as ischemic optic neuropathy, where reduced BP can result in permanent blindness. The importance of regular BP monitoring is reinforced by the evidence that lack of control is associated with HR development. Early intervention, through frequent medical consultations, is essential to identify retinal changes and promote preventive medicine. The multidisciplinary team plays a vital role in the clinical management of SAH, promoting effective metabolic control. Adherence to healthy diets and physical activity are essential to prevent chronic complications and are often exacerbated by conditions such as diabetes mellitus (DM).
Retinal vascular changes in response to elevated BP can be classified into four phases: vasoconstriction, smooth muscle degeneration, endothelial barrier disruption, and finally vessel necrosis. These changes can lead to lesions such as retinal hemorrhages and microaneurysms, which are particularly frequent in the elderly. In addition, the presence of left ventricular hypertrophy (LVH) is correlated with more severe retinal abnormalities, indicating greater involvement of the target organs of SAH.
The relationship between SAH, DM, and retinal alterations is evident, with an increase in the prevalence of ocular lesions in patients with both conditions. This highlights the importance of early and continuous screening in populations at cardiovascular risk. Ophthalmoscopy is an effective and affordable method for the early diagnosis of RH. Despite the difficulties in staging the disease through fundoscopy, this test remains a valuable resource for screening patients with target organ damage. The capacity of general practitioners and endocrinologists to diagnose retinal alterations can be expanded through training, reinforcing primary health care. The prevalence of retinal alterations observed in studies, such as the one that reached 58.7% among patients, emphasizes the need for public health strategies that promote screening and early intervention.
The management of hypertension is complex and requires an integrated approach that includes BP monitoring, promoting healthy lifestyle habits, and regular screening for complications such as retinopathy. Primary health care plays an essential role in the prevention of hypertension and its consequences, contributing to the reduction of socioeconomic inequalities and improving the quality of life of the population. The implementation of health policies that encourage BP control and early diagnosis can lead to better clinical outcomes and a decrease in complications associated with hypertension. **CONCLUSION:** Systemic Arterial Hypertension (SAH) is a disease that affects a significant part of the population and has multisystem repercussions, with hypertensive retinopathy (RH) being an important and sensitive indicator of target organ damage. People with higher chances of developing SAH, with uncontrolled weight, advanced age, or unhealthy lifestyle habits, increased cardiovascular risk, and as a result, may be more likely to have specific changes in the vascular bed and acute and chronic lesions in the retinal epithelium, identifiable by ophthalmoscopy. Even though it is possible to identify chronic lesions, the lack of a follow-up analysis over time patients, as well as the difficulty in elucidating how the underlying disease manifests in different populations, may have affected the understanding of the disease. However, this does not take away the importance of this topic in health. The growing increase in cases of SAH tends to increase the cases of RH and, therefore, compromise the quality of life of the population, negatively affecting not only the independence of patients but also their support network, since RH is an important cause of visual impairment in individuals. Thus, the paramount importance of the need for a strategic, proactive, and integrated approach is emphasized, especially in primary care, to control, track, diagnose, and prevent not only SAH but also its repercussions and manage them appropriately and promptly, aiming to reduce the complications that the disease can bring, especially RH.

Keywords: Arterial Hypertension (SAH). Hypertensive Retinopathy (RH).