Hypertension, cognitive decline, and dementia: An epidemiological perspective.

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Introduction

Hypertension, a prevalent and modifiable risk factor for cardiovascular disease, has garnered increasing attention for its association with cognitive decline and dementia. This perspective article aims to provide an epidemiological overview of the relationship between hypertension and cognitive impairment, highlighting the implications for public health and clinical practice. Hypertension, a prevalent cardiovascular risk factor, has garnered significant attention in recent years due to its association with cognitive decline and dementia. This research article provides an epidemiological perspective on the relationship between hypertension and cognitive impairment, exploring the underlying mechanisms, risk factors, and public health implications. Understanding the epidemiology of hypertension-related cognitive dysfunction is crucial for developing effective prevention and intervention strategies to mitigate the burden of dementia in aging populations.

Epidemiology of hypertension

Hypertension affects a significant proportion of the global population, with estimates suggesting that over one billion individuals worldwide have elevated blood pressure levels. The prevalence of hypertension increases with age, and it is a leading risk factor for stroke, heart disease, and chronic kidney disease. Despite advances in hypertension management, substantial gaps remain in achieving optimal blood pressure control, particularly in low and middle-income countries. he pathophysiological mechanisms linking hypertension to cognitive impairment are multifactorial and complex. Chronic hypertension contributes to cerebral small vessel disease, neurovascular dysfunction, and cerebral hypoperfusion, leading to white matter lesions, lacunar infarcts, and microvascular damage in the brain. Additionally, hypertension promotes the accumulation of beta-amyloid plaques and tau protein pathology, hallmark features of Alzheimer's disease, exacerbating neuronal injury and cognitive decline. Furthermore, hypertension-induced alterations in cerebrovascular autoregulation and blood-brain barrier integrity may compromise neuronal function and synaptic plasticity, further exacerbating cognitive dysfunction.

Association with cognitive decline

Mounting evidence from epidemiological studies suggests a robust association between hypertension and cognitive decline. Longitudinal cohort studies have demonstrated that individuals with hypertension are at increased risk of developing cognitive impairment, including Mild Cognitive Impairment (MCI) and dementia, such as Alzheimer's disease. Moreover, higher midlife blood pressure levels have been linked to an elevated risk of late-life cognitive decline and dementia, emphasizing the importance of early intervention and blood pressure management throughout the lifespan.

Underlying mechanisms

The underlying mechanisms linking hypertension to cognitive impairment are multifactorial and complex. Chronic exposure to elevated blood pressure leads to cerebral small vessel disease, microvascular damage, and impaired cerebral autoregulation, contributing to white matter lesions, lacunar infarcts, and micro bleeds. Additionally, hypertension promotes the formation of beta-amyloid plaques and neurofibrillary tangles, hallmark neuropathological features of Alzheimer's disease. Furthermore, hypertension is associated with vascular risk factors, such as diabetes, dyslipidemia, and obesity, which further exacerbate cognitive decline through vascular and metabolic pathways.

Implications for public health and clinical practice

The growing burden of hypertension-related cognitive impairment underscores the need for comprehensive strategies to prevent and manage hypertension at both individual and population levels. Public health initiatives aimed at promoting healthy lifestyle behaviors, such as regular physical activity, a balanced diet, and smoking cessation, can help reduce the prevalence of hypertension and mitigate its adverse effects on cognitive function. Moreover, integrated approaches that emphasize the management of vascular risk factors and holistic cardiovascular care are essential for optimizing brain health and preventing cognitive decline in individuals with hypertension.

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Conclusion

In conclusion, hypertension represents a significant risk factor for cognitive decline and dementia, posing substantial challenges to global health systems and societies. An epidemiological perspective highlights the importance of early detection, timely intervention, and comprehensive management of hypertension to reduce the burden of cognitive impairment and dementia. By addressing hypertension as a modifiable risk factor, public health interventions and clinical strategies can help promote healthy aging and preserve cognitive function in aging populations.

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