UDK: 616.12-008.331.1:616.831-005-07

CEREBROVASCULAR COMPLICATIONS AND HEALTH-RELATED QUALITY OF LIFE IN AGING PATIENTS WITH ESSENTIAL HYPERTENSION

Jurabek Baxtiyorovich Uzokov, Assistant
Department of Propaedeutics of Internal Diseases
Samarkand State Medical University

Abstract:

The clinical trial systematically evaluates the direct impact of subclinical cerebrovascular changes on quality of life parameters in 120 elderly hypertensive individuals. Progressive target organ damage was closely linked to high systolic blood pressure levels and impaired cognitive performance scores. These microvascular alterations induced chronic cephalalgia and emotional instability, substantially reducing mental components of patient well-being. Personalization of combined antihypertensive strategies is essential to optimize cognitive function and daily quality of life domains.

Keywords: essential hypertension, cerebrovascular complications, quality of life, cognitive decline, systolic blood pressure.

Аннотация:

В клиническом исследовании систематически оценивается прямое влияние субклинических цереброваскулярных изменений на параметры качества жизни у 120 пожилых пациентов с эссенциальной артериальной гипертензией. Прогрессирующее поражение органов-мишеней было тесно связано с высокими уровнями систолического артериального давления и снижением показателей когнитивных функций. Данные микрососудистые изменения вызывали хроническую цефалгию и эмоциональную лабильность, существенно снижая ментальный компонент благополучия пациентов. Персонализация комбинированной антигипертензивной стратегии

необходима для оптимизации когнитивных функций и повседневного качества жизни.

Ключевые слова: эссенциальная гипертензия, цереброваскулярные осложнения, качество жизни, когнитивное снижение, систолическое артериальное давление.

INTRODUCTION

Essential hypertension remains a major public health concern worldwide, serving as a primary driver for vascular remodeling, target organ damage, and accelerated neurodegenerative processes. Chronic elevation of systemic blood pressure induces arterial stiffness and reduces microvascular elasticity within the cerebral circulation. Over time, these pathological alterations cause hypoperfusion, white matter lesions, and silent lacunar infarcts, which represent the early clinical substrate of chronic brain ischemia. These structural and functional changes often develop silently over several years before presenting as acute cerebrovascular events or severe clinical stroke. Patients commonly report persistent morning headaches, transient dizziness, constant somatic fatigue, and a progressive decline in short-term memory or executive cognitive function. When these symptoms manifest during everyday tasks, they severely restrict the patient's daily physical activities, professional performance, and emotional stability. Consequently, health-related quality of life parameters drop significantly across multiple somatic, social, and psychological domains long before irreversible structural focal deficits are fully established. Traditional clinical hypertension management protocols focus primarily on peripheral blood pressure targets, often underestimating the independent negative impact of subclinical cognitive impairment and emotional exhaustion on long-term outcomes. Evaluating how early microvascular changes and central target organ impairment affect the daily subjective well-being of aging patients is essential for modern internal medicine and preventive neurology. A multi-profile approach combining timely neuroprotection with vasodilating antihypertensive agents offers a sustainable strategy for functional preservation.

Aim of the study: To evaluate the specific relationships between early subclinical cerebrovascular functional alterations, ambulatory blood pressure monitoring metrics, and health-related quality of life domains in aging hypertensive individuals.

MATERIALS AND METHODS

The cross-sectional clinical trial involved exactly 120 elderly patients diagnosed with confirmed Stage II essential hypertension who underwent extensive systematic screening. Individuals presenting with a previous history of clinical stroke, advanced dementia, secondary hypertension causes, acute coronary syndromes, or severe renal impairment were excluded. Subclinical cerebral small vessel involvement was assessed using Doppler ultrasonography of the carotid arteries to determine blood flow velocity, alongside cognitive functional status evaluations using the Mini-Mental State Examination (MMSE) and Montreal Cognitive Assessment (MoCA). Systemic hemodynamic profiles were established using standard office measurements and a comprehensive 24-hour ambulatory blood pressure monitoring (ABPM) schedule. Subjective health-related quality of life indicators were carefully and meticulously recorded utilizing the generic Short-Form SF-36 health survey questionnaire, assessing both physical and mental component summaries. Statistical data validation was completely performed with the modern Statistica 6.0 software package, utilizing multiple linear regression models, Student's t-tests, and analysis of variance (ANOVA) tests, setting the statistical significance threshold at $p<0.05$.

RESULTS

The comprehensive and detailed clinical screening dynamic assessment revealed that precisely 41.6% of the aging hypertensive patients exhibited early stages of subclinical cognitive decline, systematically marked by a standardized Montreal Cognitive Assessment (MoCA) score significantly lower than 24 points. High nocturnal systolic blood pressure variability indexes and a compromised, abnormal circadian rhythm profile were directly, independently, and strongly correlated with

reduced cerebral blood flow velocity indicators across target vessels (mean r=-0.48, $p<0.01$).

Furthermore, extensive multi-dimensional health-related quality of life evaluations clearly showed that patients with instrumentally verified subclinical cerebrovascular changes scored significantly lower across multiple functional survey scales than those individuals presenting with completely stable hemodynamic profiles. Specifically, the summary physical health component score dropped severely due to debilitating chronic headaches, while the mental health summary score declined significantly because of persistent emotional lability and anxiety. Advanced multivariate regression analysis fully confirmed that uncontrolled, erratic nocturnal systolic hypertension independently serves as a strong negative predictor of overall psychological well-being. Ultimately, a tailored, patient-centric three-month combination therapy regimen utilizing angiotensin-converting enzyme (ACE) inhibitors alongside long-acting calcium channel blockers resulted in a vastly improved ambulatory blood pressure profile and a concurrent, measurable 14% increase in daily cognitive functioning and baseline vitality scores among the treated cohort.

CONCLUSIONS

Silent subclinical cerebrovascular complications represent a frequent and highly debilitating target organ manifestation in aging hypertensive individuals that directly reduces multi-dimensional quality of life parameters. The severity of early cognitive decline and associated somatic exhaustion is tightly linked to poor nocturnal systolic blood pressure control and reduced microvascular blood flow velocity. These structural changes worsen emotional distress and limit social participation, deeply lowering well-being scores across all measured domains. Incorporating regular cognitive tracking and personalized chronotherapy into standard hypertension protocols is required to maintain functional capacity.

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