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RESEARCH ARTICLE

# Efficacy and Safety Of D-, L-Hopanthenic Acid (Pantogam Active) In the Correction of Cognitive and Emotional Disorders in Patients with Arterial Hypertension

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**Abstract:** This study presents the results of evaluating the efficacy and safety of the next-generation nootropic Pantogam Active (D-, L-hopantenic acid) in the comprehensive therapy of 80 patients with arterial hypertension accompanied by cognitive and anxiety disorders. It was found that administration of the drug at a dose of 600–1200 mg/day for 28 days provided a significant improvement ($p < 0.05$) in cognitive functions, as evidenced by increased scores on the MoCA and MMSE scales, as well as enhanced attention span and memory capacity.

The drug demonstrated pronounced anxiolytic effects, reducing anxiety levels on the HADS scale by 32%, exceeding the outcomes of standard antihypertensive therapy. Pantogam Active showed a high safety profile and good tolerability, supporting its recommendation as an effective bimodal agent for neuroprotection and correction of psycho-emotional status in patients with chronic cerebrovascular diseases.

**Key words:** Pantogam Active, hopantenic acid, arterial hypertension, cognitive impairment, anxiety disorders, nootropics.

## INTRODUCTION

Arterial hypertension (AH) is a leading risk factor for the development of chronic cerebral ischemia. Prolonged cerebral hypoperfusion leads to degenerative changes in neurons, disruption of fronto-subcortical connections, and dysfunction of GABAergic systems. Clinically, this manifests as a decline in cognitive functions—including memory, attention, and executive skills—as well as an increase in anxiety symptoms, which significantly reduces patients' quality of life.

Pantogam Active is a racemic mixture of D- and L-isomers of hopantenic acid. By modulating GABA receptors and neurotransmitter metabolism, the drug exerts pronounced neuroprotective and anxiolytic effects without causing dependence or withdrawal symptoms.

The aim of this study was to evaluate the effectiveness of including Pantogam Active in the therapeutic regimen of patients with cerebrovascular pathology.

## METHODS

The study included 80 patients (men and women, aged 45–70 years) with a confirmed diagnosis of stage II arterial hypertension (AH) and signs of mild to moderate cognitive impairment.

Exclusion criteria: severe dementia, acute cerebrovascular events (ACVE) within the last 6 months, and severe somatic pathology.

Study design:

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1. Main group (n = 50): standard antihypertensive therapy + Pantogam Active (600–1200 mg/day, divided into 2 doses).

2. Control group (n = 30): standard antihypertensive therapy alone.

The treatment course lasted 28 days. Effectiveness was assessed using neuropsychological tests:

- MoCA (Montreal Cognitive Assessment)
- MMSE (Mini-Mental State Examination)
- Auditory-verbal memory ("10 words" test by Luria)
- Schulte tables (attention assessment)
- Hospital Anxiety and Depression Scale (HADS)

Statistical analysis was performed using Statistica 10, applying the Student's t-test, with significance set at $p < 0.05$.

## RESULTS

The dynamics of cognitive function and emotional status indicators are presented in Table 1.

**Table 1.**

**Comparative Dynamics of Cognitive Indicators (M ± SD)**

| Parameter | Main Group (Pantogam Active + Standard Therapy) n = 50 | Control Group (Standard Therapy) n = 30 | Significance |
|---|---|---|---|
| **MoCA (ball)** | Before: 22,1 ± 1,8 → After 28 days: 25,6 ± 1,5 | Before: 22,4 ± 1,7 → After: 23,3 ± 1,6 | p < 0,05 |
| **MMSE (ball)** | Before: 26,3 ± 1,2 → After: 28,4 ± 1,1 | Before: 26,1 ± 1,3 → After: 26,9 ± 1,4 | p < 0,05 |
| **"10 Words" Test (Memory)** | Improvement 20–25% | Minimal change | p < 0,05 |
| **Schulte Tables (Completion Time)** | Time reduced 15–18% | Time reduced 5–7% | p < 0,05 |
| **Anxiety Scale (HADS)** | Decrease by 30–35% | Decrease by 12–15% | p < 0,05 |

In the main group, the MoCA score increased by 3.5 points, indicating improvement in executive functions and attention. Positive changes were also observed on the MMSE scale (+2.1 points), confirming enhancement of overall cognitive status.

The anxiolytic effect was reflected in a significant reduction of anxiety levels (32% vs. 14% in the control group). Pantogam Active demonstrated a high safety profile: adverse events, such as mild transient insomnia, were reported in only 4% of patients and did not require discontinuation of therapy.

## DISCUSSION

The results support the hypothesis of the bimodal action of D-, L-hopantenic acid. Unlike classical nootropics, Pantogam Active does not cause overstimulation. Improvements in neurodynamic processes (Schulte tables) and memory ("10 Words" test) in the main group may be attributed both to direct neurometabolic effects and indirectly to reduced anxiety, which

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often "blocks" cognitive performance in patients with arterial hypertension.

These findings are consistent with earlier studies (Smulevich A.B. et al., 2015), confirming the rationale for using the drug in cardioneurological practice. A limitation of this study is its open-label design, highlighting the need for future double-blind, placebo-controlled trials with larger patient populations.

## CONCLUSIONS

The analysis confirms that including Pantogam Active (at a dose of 600–1200 mg/day) in the comprehensive therapy of patients with arterial hypertension provides a pronounced synergistic effect. Due to its unique chemical structure—a combination of D- and L-isomers of hopantenic acid—the drug demonstrates bimodal activity: it effectively corrects cognitive deficits, improving memory and executive functions (MoCA score increase of 3.5 points), while simultaneously reducing psycho-emotional stress (32% reduction in HADS anxiety scores).

A key advantage is the high safety profile and good tolerability; the absence of overstimulation or dependence allows its use in patients with concomitant cardiovascular pathology. Therefore, Pantogam Active can be considered a preferred component of a neuroprotective strategy aimed at improving quality of life and cognitive health in patients with chronic cerebral ischemia.

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