Dementia is a syndrome consisting of acquired global impairment of cognitive functions and is diagnosed in about 5–9% of people aged more than 65 years. Alzheimer’s disease – a degenerative disease of the nervous system characterized by an insidious onset and inexorable progression, with the development of multiple deficits of cognitive functions (impairments of memory, thought, speech, praxis, and gnosia), leading to reductions in social, professional, and family adaptation, accounts for 70% of cases of primary dementia in older people [1, 10]. Two types of Alzheimer’s disease are identified: early-onset (up to 65 years) Alzheimer’s-type presenile dementia and later-onset (after 65 years) Alzheimer’s-type senile dementia. The second most common cause is vascular dementia, which accounts for at least 10–15% of cases of dementia in the elderly. Vascular dementia was previously regarded as the result of repeated strokes (multi-infarct dementia), though it has now been shown that this disease can develop after a single stroke in the brain zone most important for cognitive activity; it can also develop after chronic cerebral ischemia. There are a number of common risk factors for these conditions. These are, primarily, vascular brain disease and arterial hypertension. Both conditions involve characteristic changes in brain vessels (formation of lacunae, lesions to the white matter) and the same pathophysiological mechanisms in the form of transmitter impairment (acetylcholine deficiency). Another condition also quite widespread in the elderly is the so-called mixed, vascular-degenerative, dementia. Other common diseases accompanying dementia at this age include the dementia of Parkinson’s disease and Lewy body dementia, which occurs in 14–20% of patients.

The pre-dementia states in Alzheimer’s disease and the other initial stages of various brain diseases leading to dementia, as well as in age-related cognitive loss, are termed “moderate cognitive impairments.” This is now also used as a diagnosis which is used in cases of cognitive impairments not reaching the level of dementia.

At the stages of mild and moderate cognitive disorders, early diagnosis and initiation of treatment acquire great importance. The main direction of treatment at this stage is compensatory (replacement) therapy, with correction of the neurotransmitter (cholinergic) deficit. In addition, NMDA glutamate receptor antagonists are also used. The complex therapy also includes neuroprotectors, which can increase

Use of Noben (idebenone) in the Treatment of Dementia and Memory Impairments without Dementia

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Noben (idebenone) at a dose of 120 mg per day for six months was used in the treatment of 35 patients aged 60–86 years with Alzheimer’s-type dementia, mixed dementia, and memory impairments not reaching the stage of dementia. Patients were assessed on the basis of data from somatic, neurological, and psychiatric investigations, as well as neuropsychological testing and a series of psychometric and other scales and tests, before and after treatment. Significant improvements in patients’ conditions on the MMSE were seen in patients with mild and moderate dementia. Improvements in daily activities were obtained in 27% of patients. Neuropsychological investigations demonstrated improvements in short-term and long-term memory and attention, with improvements in speech functions, performance of kinesthetic, spatial, and dynamic praxis tests, and in visuospatial gnosia, thought, and writing. On the CGI scale, positive treatment effects were obtained in 37% of patients, while 48% of patients remained in a stable state.

KEY WORDS: dementia, cognitive disorders, treatment, neuropsychological investigations, Noben (idebenone).
neuron viability and plasticity, as well as nootropic treatment, which increases the metabolic activity of neurons. Vasoactive treatment is also used (including the use of *Gingko biloba* derivatives), along with vitamin treatment (vitamin E), treatment with dopaminergic agents, anti-inflammatory therapy (non-steroidal anti-inflammatories), and hormone therapy (estrogen) [13]. Antiamyloid strategies directed at reducing the synthesis of neurotoxic β-amyloid and increasing its clearance are being developed [13, 24].

During the last 15 years, successes have been obtained using Noben (idebenone), produced by Moskhimfarmpreparaty im. N. A. Semashko. This is a synthetic analog of coenzyme Q10 (a vitamin-like compound produced in the liver and stimulating the production of the energy mediator adenosine triphosphate). With age, the body’s coenzyme Q10 content decreases, justifying its use to slow aging processes and to provide prophylaxis against many diseases, including cardiovascular and neurological diseases. Coenzyme Q10 also has marked antioxidant activity, though in some conditions it can have prooxidant properties, aiding the formation of free radicals [6, 7]; furthermore, the coenzyme Q10 molecule itself is large and hydrophobic, which hinders its penetration across cell membranes, which motivated the search for derivatives (idebenone). Noben, a short-chain quinone, is characterized by lower hydrophobicity and greater antioxidant activity than coenzyme Q10 [11, 22].

New potential applications of Noben in clinical practice have been studied and developed in recent years. Animal experiments established that idebenone can increase protein and nucleic acid synthesis in the brain and stimulate the production of the energy mediator adenosine triphosphate. McDaniel et al. [14], comparing the antioxidant properties of idebenone and other antioxidants, established that idebenone has advantages in this regard.

The use of idebenone in patients with Friedreich’s ataxia has been extensively discussed in the literature [8, 20]. Idebenone was found to delay the onset of fatal outcomes as a result of positive influences on the myocardium [3, 8, 20]. The question of improvements in the neurological manifestations of Friedreich’s ataxia was controversial, though several investigators [5] showed that the use of idebenone could slow the progression and the main signs of the disease. Idebenone has also been reported to be effective in the combined treatment of patients with other diseases of the mitochondrial group, including MELAS syndrome [17].

Thai et al. [23], studying the efficacy of idebenone on cognitive functions in patients with Alzheimer’s disease, found significant improvements on the Alzheimer’s Disease Assessment Scale, cognitive subscale (ADAS-cog) in patients taking idebenone as compared with patients receiving placebo. Another multicenter double-blind, placebo-controlled trial [7] showed that treatment with idebenone produced significant improvements in memory, attention, and spatial gnosis and that it slowed the progression of Alzheimer’s disease. Comparison of the efficacy and tolerance of idebenone and tacrine in patients with Alzheimer’s disease [12] showed that 50% of patients treated with idebenone had improvements in cognitive functions, compared with 39.4% of patients receiving tacrine. A multicenter trial of the efficacy of idebenone in patients with Alzheimer’s-type senile dementia showed significant improvements in memory, attention, and behavior after treatment for four months; good tolerance of idebenone was also noted [21]. These results suggest that antioxidants can decrease or stop neuron damage due to β-amyloid and free-radical metabolites, thus delaying the progress of the disease [2].

Improvements in cognitive functions and the good tolerance of idebenone have also been demonstrated in several other studies [6, 18].

Thus, studies [4, 15] led to the view that the action of Noben, mediated predominantly by the antioxidant mechanism, has potential for use in elderly patients with impairments to cognitive functions.

The aim of the present work was to obtain additional clinical data on the efficacy of idebenone in the complex treatment of dementias and moderate memory disorders in the elderly.

**MATERIALS AND METHODS**

A simple open trial in a non-selected group of patients was performed to address the clinical efficacy and safety of treatment with Noben (idebenone) as monotherapy and combined therapy (with vascular and nootropic agents).

Patients with cognitive disorders with and without dementia were studied. Noben was used at a dose of 120 mg per day (split into two doses) for six months. The patients had previously received complex therapy including anticholinesterase agents, NMDA glutamate receptor antagonists, neuroprotectors, nootropic and vasoactive agents, etc.

A total of 35 patients (20 women, 15 men) aged 60–86 years were studied. Dementias were diagnosed in accord with IVD-10, DSM-IV, and NINCDS/ADRDA criteria. Diagnoses were of Alzheimer’s-type dementia, mixed dementia, and cognitive (memory) impairments without dementia. Patients with toxic lesions to the nervous system were excluded from the study, as were those with severe dementia.

During the study, four patients were diagnosed with presenile Alzheimer’s-type dementia (two mild and two moderate), five with moderate Alzheimer’s-type senile dementia, and 21 with mixed dementia (mild in three, moderate in 18). Five patients had memory impairments, though the symptom complex of dementia was not diagnosed. Thus, dementia was mild in five patients, moderate in 25 patients (71%), and absent in five. The most com-