INTRODUCTION

The role of disorders of the nervous regulation mechanisms in age-related pathologic processes is difficult to overestimate [3, 8, 10, 11]. It has been found that the influence, direct or indirect, of the nervous system concerns all of the processes during aging and that nervous and psychic factors play a great role in the increase in diseases and in their treatment [6, 7, 9, 14]. A universal mechanism of pathology was seen by A.D. Speranskii in the nervous-dystrophic processes, with which the very early stages of diseases are associated. His hypothesis that deregulation of metabolism in tissues and organs is the primary factor in many pathological processes is supported by many facts [1, 4, 5, 7, 12]. It is possible that a systemic approach to the study of the general somatic status of an aged patient [2], while considering an age-associated cata
aract as a local indicator of the systemic neural-dystrophic process, will make it possible to find the most important pathogenic mechanisms of age-related cata
aracts [13, 15].

The purpose of this study was to investigate the functional activities of parts of the vegetative nervous system and to perform a comparative analysis of the general somatic pathology in the formation of particular types of age-related cataracts in humans.

MATERIALS AND METHODS

The data from 198 outpatients of both sexes at ages over 60 were analyzed in a complete statistical study. The methods included biomicroscopy of the anterior eye to identify the type of age-related cataract; testing with reactive hyperemia of the skin of the forearm to determine the functional activities of the sympathetic and parasympathetic parts of the vegetative nervous system; measurement of AP (arterial pressure) and HRD (heart rate determination) with calculation of the Kerdo vegetative index using the formula: Kerdo index = (1 – D/p) × 100, where D is the DAP (diastolic arterial pressure) and p is the pulse rate. Analysis of the therapeutic pathology that accompanies the formation of age-related cataracts was made retrospectively using the data from a patient’s ambulatory records. The statistical accuracy of the results was determined using the nonparametric Wilcoxon–Mann–Whitney test.

In the course of the primary ophthalmic diagnosis based on data of bio-microscopy of the anterior segment, two clinical groups of patients were formed depending on the species of their age-related phaco
cotasmus: the first group contained patients who were suffering from an age-related cortical cataract (78 persons), while the second group contained patients who were suffering from an age-related nuclear cataract (120 cases).

RESULTS AND DISCUSSION

In 64 (82.1%) of the examined patients in Group 1, using a test with reactive hyperemia on the skin of the forearm, the expression of white dermographism was found; in 13 (16.7%) patients mixed dermographism was found, while red dermographism was found only in 1 patient (1.3%). In the second group red dermographism was revealed in 112 (93.3%) patients; no cases of white dermographism were observed, while mixed dermogra-
morphism was detected in 8 (6.7%) patients.
Measurement of blood pressure and heart rate followed by the calculation of the vegetative Kerdo index also revealed differences in the degree of the functional activities of the sympathetic and parasympathetic parts of the autonomic nervous system.

On the basis of the obtained HRD (heart rate determination) (on average 80.63 ± 1.15 beats per min; \( p < 0.05 \)) and the level of DAP ((diastolic arterial pressure) (on average 78.22 ± 1.05 mm Hg; \( p < 0.05 \)), it was found that in patients of the first group the hyperkinetic type of circulatory dynamics prevailed; the vegetative Kerdo index was 2.79 ± 1.4 on average (\( p < 0.05 \)), with 65 (83.3%) of the patients with a positive value. Characterizing the HRD (71.86 ± 0.7 beats/min on average; \( p < 0.05 \)) and DAP level (88.33 ± 0.85 mm Hg on average; \( p < 0.05 \)), it should be noted that the hypokinetic type of hemodynamics is more characteristic of the second group and the Kerdo index was 23.52 ± 1.28 on average (\( p < 0.05 \)) and was found to have negative values in all of the 120 patients (100%).

In the course of the study, important relationships in the formation of particular types of age-related cataract and the character of accompanying general somatic diseases were found. It was found that patients of the first group suffered from true hypertensive disease 11.5 times more often than patients of the second group (no more than 5.8%). In patients of the second group symptomatic arterial hypertension and atherosclerosis of cerebral vessels were found 16 and 1.9 times more often than in patients with cortical cataracts. Angina of effort was found 19.3 times more often in patients of the first group, while myocardial infarction and aortic atherosclerosis were found in this clinical group only 1.3 and 1.2 times more often.

Neurological diseases are 1.2 times more likely to accompany the formation of the nuclear type of age-related cataract; in 0.8% of the patients of the second group, acute cerebrovascular accident (ACVA) was diagnosed, and the frequency of detection of vascular encephalopathy did not differ significantly in both groups (in the first group, 1.3%; in the second group, 1.6%). It is important to note the unequal detection rate of the pathological neurological Bernard—Horner syndrome (ptosis, miosis, and enophthalmos) that is due to a disorder of sympathetic innervation. In the first group of patients, none of the Bernard—Horner triad of syndrome symptoms was found. However, in the second group the unilateral Bernard—Horner syndrome was found in 77 (64%) patients.

The pathology of the GIT (gastrointestinal tract) was found 2.3 times more frequently in patients of the second group, among which pathology of the colon (4.8%) and that of the gall bladder (4%) predominate. In the patients of the first group, the more common outwardly observed pathology is that of the duodenum (3.9%) and pancreatic cancer (2.6%). It was found that patients in the second group were 3.1 times more likely to suffer from chronic inflammatory diseases of different localizations, while in the second group of patients only 6.5% suffered from this pathology.

It was found that the frequency of allergic reactions was 6.5 times higher in the first group patients.

Respiratory diseases were 1.9 times more frequent in the second group of patients. In the first group of patients the diseases of an allergic nature (bronchial asthma) dominated; patients of the second group suffered from chronic inflammatory diseases of the upper respiratory tract (chronic pharyngitis and rhinosinusitis) more often than those of the first group.

Pathologies of the urinary tract in patients of the second group occurred 5.5 times more often than those in the first group (7.2 and 1.3%, respectively). In the second group of patients, chronic inflammatory processes (pyelonephritis and cystitis) were more common.

Diseases of the musculoskeletal system (deforming osteoarthritis) were accompanied by the formation of the nuclear type of age-related cataract 3.2 times more often.

Endocrine pathology was diagnosed in patients in the second group 1.5 times more often. The frequency of concomitant type 2 diabetes in both groups of the study was not equal; it occurred 1.9 times more often with the formation of nuclear cataracts. Hypothyroidism was diagnosed in patients of the first group 3.3 times more often.

In patients of the second group, the diffuse multinodular goiter was from 2 to 3 times more common and cancer of various endocrine and exocrine glands was found 9.6 times more often.

Tumors were diagnosed in 30.8% of the patients of the second group: in 10.8% of the cases they were non-malignant, in 20% of the cases they were malignant. It is important to note that in the study of the frequency and nature of the accompanying tumors, the oncologic history of the 2nd group patients had 15.4 times more burdened patients than that of the 1st group patients. Malignant tumors of the skin and mucous membrane prevailed (19.2%); a multiple character of neoplasms was described for 4.2% of the patients.

Thus, a doctor of any specialty has the ability to use a new and pathogenically substantiated accessible marker of socially important diseases in his practical activities.

The analysis of the information that was obtained in the course of this research demonstrates the regular symptoms of age-related involution of various parts of the vegetative nervous system. Using the previously found [1, 3, 11] considerable differences in the biogenic amine provision of processes in the formation of age-related cortical and nuclear cataracts, it is possible to show the importance of the neurotrophic influence of the sympathetic and parasympathetic parts of the vegetative nervous system on the formation of one of these types of age-related cataract. In addition, the analysis of the frequency and character of general somatic diseases that accompany the formation of particular types of age-related cataracts also demonstrates regular