Features of ophthalmological pathologies that occur against the background of neuropsychiatric disorders

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Abstract
The present study is devoted to a comprehensive analysis of the relationship between neuropsychiatric disorders and ophthalmological pathologies. The paper provides an overview of the latest scientific data on this problem, with an emphasis on the pathophysiological mechanisms linking both groups of diseases. The mechanisms of the influence of psychological factors, such as stress and anxiety, on the state of the visual system, as well as the influence of changes in neurochemistry and neuroplasticity on the development of ophthalmic diseases are considered.

The clinical manifestations of ophthalmological pathologies in patients with various neuropsychiatric disorders, including depression, anxiety disorders, schizophrenia, etc., are analyzed in detail. The results of clinical observations and studies confirming the importance of this relationship are presented. In addition, the article highlights modern methods of diagnosis and treatment of ophthalmological manifestations in patients with neuropsychiatric disorders. Psychotherapeutic approaches and rehabilitation methods are considered, taking into account the specifics of the patient’s condition.

Keywords
Ophthalmological pathologies, Neurological disorders, Psychological factors, Diagnosis, Rehabilitation.

INTRODUCTION
In the modern world, mental health issues are becoming more relevant and discussed. Neuropsychiatric disorders such as depression, anxiety disorders, schizophrenia and others have a significant impact on the quality of life of millions of people around the world[1]. At the same time, scientific research continues to expand our understanding of the relationship between mental and physical health.

One of the areas requiring further study is the relationship between neuropsychiatric disorders and ophthalmological pathologies. Despite the fact that both of these fields of medicine have been studied independently of each other, recent scientific evidence indicates the existence of a close relationship between them [2]. Patients with neuropsychiatric disorders often face various ophtalmological problems, including changes in visual functions and the development of ophthalmological diseases. Ophthalmic disorders, on the other hand, have psychiatric aspects associated with them at various levels [3]. Psychological factors play a well-documented role in the occurrence, deterioration and maintenance of various ophthalmological diseases, including glaucoma, central serous retinopathy, dry eye syndrome and retinitis pigmentosa. Many ophthalmological diseases, including blindness, have psychological manifestations that need to be addressed in addition to ophthalmological pathology.

The purpose of this study is to analyze modern scientific data and consider the features of ophthalmological pathologies that occur against the background of neuropsychiatric disorders.

MATERIALS AND METHODS OF RESEARCH
During the preparation of the study, an extensive literary review of scientific articles, monographs and...
other sources related to the relationship between neuropsychiatric disorders and ophthalmological pathologies was conducted. In the course of the literature review, modern theories, concepts and experimental data concerning the pathophysiological and clinical aspects of this problem were analyzed. Based on the literature review, a conceptual analysis of key concepts such as neuropsychiatric disorders, ophthalmological pathologies, pathophysiological mechanisms of the relationship between them, etc. was carried out.

RESULTS

Psychological factors play a key role in the occurrence, deterioration and maintenance of many ophthalmic diseases. Experts note that psychological stress has a certain effect on intraocular pressure (IOP). Stress can change IOP in people with angle-closure glaucoma, which is also affected by their emotional state. Since IOP is a key indicator of angle-closure glaucoma, it is possible that stress reduction can help patients cope with their symptoms [4].

Stress, sleep problems and the use of psychopharmacological substances are risk factors for the development of central serous chorioretinopathy (CSCR). Catecholamines and glucocorticoids, which are mediators of psychological stress, are responsible for changes in the autoregulation of choroidal blood flow and the development of CSCR.

Experts also point out that some characteristics of temperament and personality are associated with CSCR. These include emotional dissociation, low tendency to cooperate, decreased tolerance to frustration, emotional instability, self-doubt, etc. [6].

It has also been noted in the literature that dry eye disease (BSG) has a definite association with sleep disorders, anxiety, depression, schizophrenia, post-traumatic stress disorder (PTSD) and mood swings [7].

The literature describes the relationship of depression with BSG. This relationship may be based on several factors. Although the exact pathways of development are unknown, the pathophysiology of these two diseases may be similar. It is assumed that both diseases have common risk factors, such as female gender and menopause. Inflammation also plays an important role in the development of BSH, and the anti-inflammatory properties of omega-3 polyunsaturated fatty acids (PUFA) have been shown to help alleviate the symptoms and signs of dry eye. Studies have also shown that chronic or prolonged depression can increase the production of both acute and chronic proinflammatory cytokines, which can thereby worsen the symptoms of BSG [8].

Some experts point out that the degree of subjective ocular symptoms does not correspond to the severity of the signs of BSG, which can be partially explained by a decrease in corneal sensitivity caused by prolonged activation of the neuro-reflex arc. However, individual perception of pain, as well as depression and anxiety, can also contribute to this discrepancy [9].

Separate research results indicate that BSG was more often observed in patients who were first diagnosed with major depressive disorder (MDD).

Another study of depression, post-traumatic stress disorder, and dry eye syndrome found that there is a significant association between the severity of BSG and symptoms of depression and anxiety. The authors of this study indicate that treatment of BSG can have a positive effect on reducing the patient’s anxiety level [10]. The results showed that the assessment and treatment of BSG in patients with depression can improve their quality of life, so early detection of BSG is extremely important for such patients.

There are many studies that have studied the etiology of BSG in patients with depression, and although the exact cause is unknown, they suggest various factors such as interleukin levels, serotonin levels, age, gender, duration of depression, and use of antidepressants [11].

In light of the literature data, it can be concluded that depressive disorders themselves can cause dry eyes, and psychiatric medications can alleviate the symptoms of BSG.

The researchers also note that psychological stress has been recognized as one of the triggers for the development of photopsia, often found in retinitis pigmentosa (RP).

DISCUSSION

Manifestations of ophthalmic diseases can be characterized by neuropsychiatric symptoms, while most of the symptoms are secondary to the underlying disease [12].

Visual impairment and blindness can have different natures and, although these pathologies may not
have a neuropsychiatric basis, they can still have a secondary negative effect on the human psyche. Visual impairment also has serious psychosocial consequences that worsen the patient's quality of life [13]. Ophthalmic pathologies impede mobility and access to social contacts, as well as deprive people of the opportunity to work or engage in activities that are familiar to them. The consequence of this situation may be social isolation, alienation, loneliness and loss of social contacts. Therefore, the fight against ophthalmological pathologies in itself is an important factor that makes people with blindness or significant visual impairments feel depressed and lonely [14].

Patients with various visual impairments may experience an inferiority complex, anxiety, melancholy and other psychological problems. When trying to cope with everyday life obstacles, such patients experience a wide range of emotions such as fear, rage, frustration and denial. It was also found that they became more anxious, depressed and addicted to psychoactive substances [15]. Quite often, such patients experience sleep and wakefulness disorders.

The psychological reaction to significant visual impairment or blindness is described in stages: disbelief, protest, depression, etc. In the pediatric population, this problem becomes even more complex [16]. Visual impairment causes additional consequences in children, such as developmental delay and learning difficulties. Young patients with blindness are reported to have autistic developmental symptoms such as difficulties with social interaction and communication, emotional expression and recognition, symbolic and functional games, and stereotypes. It was noted that the facial expressions of visually impaired people are poorer compared to their sighted peers.

In rare cases, progressive vision loss may be associated with hallucination syndrome, which may bother patients. Complex visual hallucinations usually occur in people with visual and cognitive impairments due to acquired visual impairments and are not related to their chronological age [17].

People who have recently gone blind have experienced visual hallucinations, repetitive subjective reactions to dreams and waking experiences, which have collectively been conceptualized as the equivalent of the “phantom limb phenomenon.”

It was found that some patients with cataracts have difficulties with spatial memory, and cases of paranoid and hypochondriac reactions have also been noted, which have been interpreted as attempts to hide blindness and helplessness [18].

Photopsia and dysmegalopsia are among the common visual phenomena described in connection with various conditions. These are non-specific symptoms that can accompany a wide range of diseases of various etiologies [19]. Here it is important to consider some ophthalmological conditions associated with these phenomena.

Photopsies are simple visual pseudo-hallucinations consisting of unformed geometric shapes or light phenomena. They are a swarm of flickering, pulsating or flickering lights that occur in diseases of photoreceptors. Patients with severe visual impairment have more frequent photopsies because they are more common in the absence of light and visual cues. Photopsies are considered to be the result of spontaneous activity of degenerating retinal cells resulting from remodeling of the inner retina. When the typical interaction between action potential formation, discharge, and inhibition is disrupted, intact neurons are more likely to discharge spontaneously due to the absence of afferent signals [20].

Illusions most often occur in the visual modality. They can occur in healthy people, but are more common in people with neurological diseases. Although precise localization and determination of etiology are impossible in most situations, lesions of the occipital and occipitotemporal regions near the visual pathways are usually the cause.

Hallucinations can be unformed or formed. Visual hallucinations have also been described in the context of sensory deprivation. Experts point to the impact of social isolation and the lack of diversity in the provision of information among representatives of processes such as heavy-duty truck drivers who spend long hours alone, marine explorers, etc. Manifestations include drowsiness, irritability, and intense visual and auditory hallucinations [21].

Age-related macular degeneration (ARMD), which is a common cause of visual impairment and blindness in the elderly, has a significant impact on their quality of life. Increased functional disability is the most typical negative effect of visual impairment associated with ARMD. As a result, patients are more likely to have mental health problems such as depression and anxiety.

BSG can cause chronic irritation and visual impairment, which can cause anxiety and even exacerbate
depression. With BSG, sleep disorders are widespread, from which almost half of the patients suffer. Such disorders can have devastating consequences, affecting sleep in various ways, including an increase in the latent period of sleep, its short duration and poor subjective quality [22].

Depression is a significant contributing factor, and poor sleep, which is usually associated with depression, can be exacerbated by other causes of BSG, which leads to reverse effects that worsen both BSG and symptoms of depression. Since BSG and depression often coexist, treatment of one of them affects the symptoms of the other. Dry eyes can be caused by antidepressants and aggravated by them [23].

Glaucoma is associated with an increased risk of developing major depressive disorder, bipolar disorder, and schizophrenia in the future. It has been suggested that the neurodegenerative pathway is a common link between glaucoma and mental illness. Patients with RP, as the researchers note, are 4 times more likely to have symptoms of depression and anxiety disorders compared to the general population. Thus, one group of researchers, after conducting a study of 450 patients, determined that there was a high prevalence of obsessive-compulsive disorder, schizophrenia, antisocial personality, paranoia, hypochondria, depression, hysteria, etc.

Experts note that medications used for ophthalmic diseases can also have side effects on the part of the psyche, and the most important of them are described here. The association of side effects from the central nervous system with oral beta blockers was first published several years ago. Among the side effects, for example, of the drug timolol, depression and psychosis were noted. Depression, psychosis, confusion, and hallucinations have been reported as side effects of topical ophthalmic treatment with this drug. It is believed that topical use of timolol can cause rapid changes in mental status or the occurrence of common mental illnesses such as depression. After discontinuation of the drug, these side effects usually disappear within a week [24].

Corticosteroids are associated with a wide range of psychological side effects. According to experts, symptoms such as euphoria, insomnia, mood swings, personality changes, severe depression and psychosis (also known as corticosteroid-induced psychosis) were observed in 5-18% of people receiving corticosteroids.

Due to their lipophilic nature and ability to cross the blood-brain barrier, alpha agonists can cause symptoms from the central nervous system such as lethargy and drowsiness. In turn, carbonic anhydrase inhibitors, which are used to treat glaucoma, can cause depression, delirium and anorexia [25].

Also, some researchers in their works focused on the psychonerological symptoms of patients who underwent ophthalmological surgical procedures. Surgery can be a stressful event that can lead to a psychological anxiety reaction. However, in addition, it can also cause physiological changes associated with arousal of the sympathetic nervous system, such as tachycardia, hypertension, hyperventilation, muscle tension, trembling and sweating. There are reports that preoperative anxiety and cardiovascular history in combination with prolonged ultrasound examination during cataract phacoemulsification are significantly more often associated with intraoperative complications.

Going through the various stages of ophthalmic surgery can cause the patient significant anxiety and anxiety. This fear and anxiety can have many causes. The main ones include the fear of surgery, for example, the fear that the procedure will be painful, the fear of failure and the fear of possible deterioration or loss of vision. It is also believed that in ophthalmic surgery, the fear of going blind is similar to the fear of death associated with serious surgery.

Spending time with the patient to find out the causes and circumstances affecting preoperative experiences and anxiety can be very useful. In addition to ophthalmologists, other medical professionals such as nurses, social workers, and psychologists can reduce the patient's anxiety before surgery and prevent the development of stress and other anxiety conditions.

Conclusions. Thus, we can conclude that there are quite a lot of aspects connecting ophthalmology, neurology and psychiatry. Ophthalmologists should know the psychiatric aspects of ophthalmic disorders to facilitate early detection and communication with psychiatrists.

Despite the fact that many researchers pay attention to the above connection, there are enough opportunities for further research in this area. The considered links between various aspects of psychiatry and ophthalmology require recognition and further consideration, since in-depth study of issues within the framework of the connection of neuropsychiatric
and ophthalmological pathologies will increase the effectiveness of patient therapy, as well as improve their quality of life.

LIST OF LITERATURE