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ABSTRACT

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FEATURES OF THE COURSE OF RARE COVID-19 COMPLICATIONS

Introduction. Among all the microorganisms that inhabit the human body and surround it in the environment, a significant share belongs to viruses, which, in the constant struggle with other microflora, create conditions for their existence and affect their host. Most viruses, as well as other microorganisms, including the shingles virus, have a certain organotropy. HZ viruses are neurophilic; at a certain stage of a person's life, after having chicken pox, more often in childhood and adolescence, they settle mainly in the nervous structures, namely in the ganglia. Most frequently, cranial nerve ganglia, thoracic ganglia, and nerves of the pelvic cavity are affected. The viruses remain dormant in the ganglia and wait for the time, when the functional capacity of the innate and acquired immunity will be inhibited. The most powerful negative influence on this system in today's conditions is imposed by military actions and the COVID-19 infection. Once activated, the HZ virus attacks the corresponding nerve structures, which causes inflammation and violates the function of the corresponding organs and muscles, up to and including paresis. The main symptoms are pain and itching, which "knock out" the patient from the normal rhythm of life.

The urgency of the problem is due to the fact that the body rash in the patients that we consulted appeared 5-6 days after the pain syndrome and itching, which misled the clinicians.

Objective. To study the features of the course of rare COVID-19 complications and to share our own observations.

Materials and Methods. We observed 4 patients who developed complications after COVID-19. Among these patients, there were 3 male persons aged over 60 years and one female patient aged 50 years.

Results and Discussion. The patients with a past history of COVID infection had shingles-like complications: of the chest – in 2

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subjects and of the brachial plexus – in 2 subjects. Two patients developed HZ in the form of intercostal neuritis. The disease progressed in a standard way, with pain and a rash localized along the intercostal nerves. Another two patients had complications represented by the inflammation of the brachial plexus, i.e., lesions of the trigeminal nerve branches and the vagus nerve branches, which belong to the brachial plexus and cardiac nerves. These complications manifested as vegetative disorders, including periodic "attacks" of hyperemia, dryness or sweating of the right half of the face. One of these patients had paresis of the left vocal cord, which seemed to be the most dangerous of all complications.

Conclusions. COVID-19 infection is a trigger activating persistent shingles virus and causing a number of complications related to HZ.

Keywords: COVID-19 infection, shingles, rare complications.

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ОСОБЛИВОСТІ ПЕРЕБІГУ РІДКІСНИХ УСКЛАДНЕНЬ КОРОНА-ІНФЕКЦІЇ

Вступ. Поміж усіх мікроорганізмів, які населяють тіло людини і оточують його у зовнішньому середовищі, вагома доля належить вірусам, які у боротьбі з іншою мікрофлорою «створюють умови» для спокійного фізіологічного існування хазяїна. Більшість вірусів, як і мікроорганізмів взагалі, у тому числі й віруси оперізувального лишая, мають певну органотропність. Віруси HZ, маючи нейрофілії, на певному етапі життя людини, частіше у дитячому та юнацькому віці після перенесеної вітряної віспи, поселяються головним чином у його нервових утворах, а саме – у гангліях. Найбільш частими поміж них є ганглії черепно-мозкових нервів, ганглії спино-мозкових нервів грудної клітки та нервові утвори тазової порожнини. Зберігаючись у гангліях в стані персистенції, віруси «чекають» свого часу, коли настане гальмування функціональної здатності факторів природженого і набутого імунітету. Найбільш потужним негативним впливом на цю систему в умовах сьогодення мають воєнні дії та система COVID-ої інфекції. Активувавшись, віруси HZ вражають відповідні нервові утвори. Які в стані запалення порушують функцію відповідних органів і м'язів, аж до їх парезу. Провідними симптомами при цьому бувають біль і свербіж, які «вибивають» хворого із нормального ритму життя.

Актуальність проблеми в тому, що у консультованих нами хворих висипка на тілі з'явилася після больового синдрому і свербіжу через 5–6 діб, що зміщувало клінічне мислення в іншому напрямку.

Мета роботи. Вивчити особливості перебігу рідкісних ускладнень корона-інфекції та поділитися власними спостереженнями.

Матеріали і методи. Ми спостерігали 4 хворих, у яких розвинулося ускладнення після перенесеного COVID-19. Поміж цих хворих було 3 особи чоловічої статі у віці понад 60 років і одна хвора – жіночої статі у віці 50 років.

Результати та обговорення. Спостережені нами три хворі після перенесеної COVID-інфекції мали ускладнення за типом оперізувального лишая грудної клітки у 2 осіб і оперізувального

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лишаю плечового сплетіння – у 2 досліджених. У двох хворих розвинувся НЗ за типом міжребрових невритів. Захворювання перебігало типово з болями і висипкою за ходом міжребрових нервів. У двох хворих ускладнення перебігало за типом запалення плечового сплетіння з ураженням гілочок трійчастого нерва і гілочок блукаючого нерва, які входять до плечового сплетіння та серцевих нервів, проявляючись вегетативними порушеннями, поміж яких періодичні «напади» гіперемії, сухості або пітливості правої половини обличчя. У одного з цих хворих мав місце «парез» лівої голосової зв'язки, що нам здається найбільш небезпечним поміж усіх ускладнень.

Висновки. Корона-інфекція є тригером для активації персистуючих вірусів оперізувального лишаю і ряду ускладнень, які викликає НЗ.

Ключові слова: корона-інфекція, оперізувальний лишай, рідкісні ускладнення.

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INTRODUCTION / ВСТУП

Man lives in the macroworld in close proximity to the microworld. The latter is known to use the human body as their own dwelling. The number of microorganisms that inhabit our body reaches up to 6–7 kg. Among all microorganisms, a significant share belongs to viruses, which, in the constant struggle with other microflora, create conditions for their existence and affect their host. Some viruses, including herpes zoster (HZ), are neurophilic. At a certain stage of a person's life, more often in childhood and adolescence, they incorporate a human's body and settle mainly in the nervous structures. Most frequently, the virus affects cranial nerve ganglia, thoracic ganglia, and nerves of the pelvic cavity. In most of the carriers, the HZ virus remains dormant in the ganglia and waits for the time, when the functional capacity of the innate and acquired immunity will be inhibited. This can happen under various extreme conditions and is accompanied by inhibition of the functional capacity of the reticulo-endothelial system [1, 2]. Under such conditions, persistent causative agents (viruses) move along the nerve structures and reach the skin. After reactivation, the viruses provide a toxic effect on the nerve tissues of the ganglion and postganglionic nerve fibers and cause various vegetative manifestations, which depend on the prevailing toxic effect on the sympathetic or parasympathetic divisions of the autonomic nervous system. In addition to the leading symptoms of ganglionitis, which include pain symptoms, itching, and rash along the course of the corresponding nerves, there may occur other symptoms. When the ganglia of the spinal nerves are affected, they manifest with the

neurological signs typical of the nerves innervating the thoracic section (pleura, diaphragm, interstitium, pericardium and heart muscle (cardiac plexus), aorta, esophagus, pharynx, oral cavity, vocal cords ligaments and other parts of the facial skeleton); neck, shoulder girdle, shoulder, forearm, hand, fingers. Pain syndrome in parts of the body that are innervated by the named nerve structures can have the widest range. It depends on many factors, which we will not discuss here since they concern the pathophysiology of pain in general [3].

Another syndrome that arises based on nerve lesions is itching, which, similar to the pain syndrome, can be of different intensity. This syndrome is localized in the area of innervation of the corresponding nerve or along its course.

Less important syndromes (impaired skin moisture balance, pallor or hyperemia, anesthesia or hyperesthesia, atypical sensation of “skin crawling”) appear depending on the prevailing spinal ganglia lesion [4, 5]. In addition to nervous system damage, the virus also has a specific tropism to the epithelial cells of the skin, which leads to various manifestations in this part of the human body. Among them, the most pathognomonic manifestation is a vesicular rash on the background of hyperemia and papular formations. Rash, as well as itching, tends to occur along the course of nerves [6]. It is possible to detect shingles virus in the vesicular contents, which confirms its connection with this disease. Another epidemiological feature of the disease is its manifestation mainly after 60 years of age [7]. On the other hand, the clinical manifestations are currently facilitated by military actions in Ukraine, population migration, and economic difficulties, which

are accompanied by immune disorders and the development of various diseases. In addition, the activation of persistent viruses leads to the activation of a persistent infection. The above-mentioned features against the background of the immune system inhibition in our conditions substantiates the relevance of the problem since the pathogenesis of the disease provides conditions for the challenges of differential diagnosis and, accordingly, provokes misdiagnosis. On the other hand, peripheral nervous system lesions can be accompanied by various complications, the consequences of which have not been well studied so far. However, today, COVID-19 infection should make us pay more attention to its course since this is the most triggering process that can lead to the activation of other persistent infections, including tuberculosis and herpes zoster.

Due to significant external influence, the persistent pathogen can be activated, moving along the course of various nerves to the skin, which is accompanied by the clinical picture of various neuritis, and possibly ganglionitis [8].

The immunosuppressive effect of the COVID-19 infection on the human body is well-studied now. However, in most patients, this effect is manifested by respiratory complications, i.e., interstitial or parenchymal inflammatory processes. Among other complications, cardiovascular complications are mainly reported. During the period that has passed since the verification of COVID-19 in one of the Chinese provinces, the infection has invaded the whole world and managed to mutate at least twice, changing the epidemiology of the disease, its course, and, to a large extent, clinical manifestations. The incidence of the disease has decreased somewhat. Due to some changes in the clinical picture and the development of diagnosis and treatment algorithms in all countries, mortality has decreased, which has sharpened the focus on COVID-19. However, the complications that accompany COVID-19 have not been sufficiently studied [9, 10].

Rationale. Since COVID-19 infection is characterized by an inhibitory effect on the immune system, the complications during its course can affect any organs and system, which, in our opinion, can resemble Herpes Zoster (HZ). The above-mentioned conclusion brings these two infections together and substantiates the relevance of the problem.

Objective. To study the features of the course of rare COVID-19 complications and to share our own observations.

Materials and Methods. During 2023 and three months of 2024, we observed and consulted 3 male patients aged 60+ and one 50-year-old female patient. They all had a history of COVID-19 infection and

presented with a COVID-associated complication defined as shingles.

Results. Since two patients had complications represented by intercostal neuralgia-shingles, we will not dwell on them. We will illustrate another observation that, along with typical symptoms, had other signs that were indicative of intoxication and nerve lesions.

A seventy-one-year-old patient, an employee, worked actively and intensively, was physically strong enough, and used to agree eagerly to any menial work. Five months before the manifestation of this complication, he developed a typical COVID-19 infection case, which, however, had a relatively "calm" course, and the patient was treated outpatiently. His physical activity was limited. This, however, was caused rather by general weakness. The patient developed a sore throat, strong unproductive coughing fits occurring during any meal, and loss of smells and tastes, which resembled a similar COVID-19-related condition. At the same time, pain appeared in the right and left upper arms, in the shoulder joints, along the outer surface of the right shoulder. Numbness began to appear in all parts of the left hand, especially in the fingers, and occurred mostly at night. Changing the position of the hand helped to relieve this condition. This could happen up to 10 times a night. At the same time, increased sensitivity of the skin appeared in the left half of the head. Periodic hyperemia of the left half of the face developed. In the corner of the clavicle-trapezius-sternocleidomastoid muscle area (the base of the neck), severe itching appeared, which also involved the back surface of the auricle and the skin around it. A few days later, hyperemia, papular rash, and vesicles developed there. This lasted for up to 2 months.

No anti-inflammatory, desensitizing, or antiviral drugs managed to change the general condition of the patient and local manifestations, although the clinical symptoms gradually decreased. Among other symptoms, itching, rash, and cough persisted the longest; the cough gradually changed to a productive cough. The torpid course of the disease and unbearably severe itching forced us to prescribe Pregabalin (in this particular patient and a female patient with shoulder-hand syndrome) as a single dose of 25 mg twice a day. The effect of this drug turned out to be very evident: on the second day of its use, the intensity of itching decreased; in one more day, it occurred several times a day. After 5 days, itching occurred only after some mechanical irritation of the rash area and used to disappear in 1–2 days [11].

We present a photo of the rash in the third week of the disease (Figure 1).



Figure 1. A rash on the cervicobrachial triangle in the form of papules and vesicles

The peculiarity of this COVID-19 complication was represented by throat irritation, which was accompanied by pain. Most importantly, in our opinion, this complication was accompanied by the phenomena of vocal cords and laryngeal “micro paresis,” which could lead to “microaspirations.” These things can happen when patients are conscious. In unconscious patients, for example, when transferring to artificial ventilation,

unsurpassable medical difficulties may arise since the immunity of these patients is inhibited. This, in fact, led to the development of ganglionitis. It is difficult to say how often this complication occurs in patients when they are transferred to artificial ventilation since they are not regularly and systematically consulted by ENT specialists, and patients with hypoxia signs are usually intubated. So, what leads to mortality in these patients?

CONCLUSIONS / ВИСНОВКИ

1. COVID-19 infection inhibits the body's immune-reactive abilities and promotes the activation of persistent microflora, in particular, the herpes-zoster virus in the ganglia of the nervous system.

2. Herpes-zoster virus causes a nerve lesion, which is accompanied by a pain syndrome, a rash in the corresponding area, and vegetative and functional disorders of the organs that these nerves innervate.

3. The duration of these syndromes, especially itching, depends on the nature of the therapy. The main drug that had a positive effect on our patients was Pregabalin at a dose of 25 mg 2 times a day combined with vitamin therapy (Neurobion).

4. Patients with signs of ganglionitis should be consulted by ENT specialists in a timely manner in order to establish a possible paresis of the vocal cords.

PROSPECTS FOR FUTURE RESEARCH / ПЕРСПЕКТИВИ ПОДАЛЬШИХ ДОСЛІДЖЕНЬ

To study the condition of the vocal apparatus, namely the vocal cords, in patients with viral processes: chicken pox, COVID-19 infection, shingles.

AUTHOR CONTRIBUTIONS / ВКЛАД АВТОРІВ

All authors substantively contributed to the drafting of the initial and revised versions of this paper. They take full responsibility for the integrity of all aspects of the work.

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CONFLICT OF INTEREST / КОНФЛІКТ ІНТЕРЕСІВ

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