

**THE RESULT OF STUDIES OF CLINICAL AND NEUROLOGICAL
COMPLICATIONS IN PATIENTS WITH POLYNEUROPATHIES OF THE
ETIOLOGY COVID-19**

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Annotation: Most people who fall sick with COVID-19 will experience mild to moderate symptoms and recover without special treatment. However, some will become seriously ill and require medical attention. Coronavirus pandemic 2019-2020 illustrated not only the high aggressiveness of the new infectious agent, moreover its capacity to cause severe cardiovascular complications. During the course of the coronavirus infection, it is possible to develop not only pulmonary, but also other neurological complications. Some symptoms experienced by some people weeks to months after COVID infection suggest the peripheral nervous system, the vast communication network that sends signals between the central nervous system (the brain and spinal cord) and all other parts of the body, is impaired.

Objective: To evaluate the clinical and neurological characteristics of patients with polyneuropathies of coronavirus etiology.

Methods: The study included 62 patients with polyneuropathies, the main group of 32 patients with polyneuropathies who underwent coronavirus disease and 30 patients with polyneuropathies.

The results obtained: At the time of inclusion in the study, patients' complaints were dominated by sensory disturbances, signs of numbness, weakness and decreased performance in 97% of patients in the main group and 95% of the comparison group.

Conclusion: The conducted clinical and neurological analysis shows that with polyneuropathy there is an increase in neurological symptoms after suffering a coronavirus disease and requires targeted tactics for the introduction and complex treatment of patients.

Key words: polyneuropathy, neurological symptoms, complications, COVID-19.

**РЕЗУЛЬТАТ ИССЛЕДОВАНИЙ КЛИНИКО-НЕВРОЛОГИЧЕСКИХ
ОСЛОЖНЕНИЙ У ПАЦИЕНТОВ С ПОЛИНЕЙРОПАТИЯМИ ЭТИОЛОГИИ
COVID-19**

Аннотация: Коронавирусная болезнь (COVID-19) — это инфекционное заболевание, вызываемое вирусом SARS-CoV-2. Большинство людей, которые заболевают COVID-19, будут иметь симптомы легкой или средней степени тяжести и выздоравливают без специального лечения. Однако некоторые серьезно заболеют и потребуют медицинской помощи. Пандемия коронавируса 2019-2020 годов продемонстрировала не только высокую агрессивность нового инфекционного агента, но и его способность вызывать тяжелые сердечно-сосудистые осложнения. В течении коронавирусной инфекции возможно развитие не только легочных, но и других неврологических осложнений. Некоторые симптомы, с которыми сталкиваются некоторые люди через несколько недель или месяцев после заражения COVID, указывают на то, что периферическая нервная система, обширная коммуникационная сеть, которая посылает сигналы между центральной нервной системой (головным и спинным мозгом) и всеми другими частями тела, нарушена.

Цель: оценить клинико-неврологическую характеристику пациентов с полиневропатиями коронавирусной этиологии.

Методы: в исследование включены 62 пациента с полинейропатиями, основную группу составили 32 пациента с полинейропатиями, перенесшие коронавирусную болезнь, и 30 пациентов с полинейропатиями.

Полученные результаты: На момент включения в исследование в жалобах больных преобладали нарушения чувствительности, признаки онемения, слабость и снижение работоспособности у 97% больных основной группы и 95% группы сравнения.

Выводы: Проведенный клинико-неврологический анализ показывает, что при полинейропатии наблюдается нарастание неврологической симптоматики после перенесенного коронавирусного заболевания и требует целенаправленной тактики введения и комплексного лечения больных.

Ключевые слова: полиневропатия, неврологическая симптоматика, осложнения, COVID-19.

COVID-19 ETIOLOGIYALI POLINEVROPATIYASI BO'LGAN BEMORLARDA KLINIK VA NEVROLOGIK ASORATLARNI O'RGANISH NATIJALARI

Annotatsiya: Koronavirus kasalligi (COVID-19) SARS-CoV-2 virusi keltirib chiqaradigan yuqumli kasallikdir. COVID-19 bilan kasallanganlarning aksariyati yengil va o'rtacha darajadagi alomatlarni boshdan kechiradi va maxsus davolashsiz tuzalib ketadi. Biroq, ba'zilar jiddiy kasal bo'lib, tibbiy yordamga muhtoj bo'ladi. 2019-2020 yillardagi koronavirus pandemiyasi nafaqat yangi yuqumli agentning yuqori tajovuzkorligini, balki uning yurak-qon tomir tizimiga jiddiy asoratlarni keltirib chiqarish qobiliyatini ham ko'rsatdi. Koronavirus infeksiyasi davrida nafaqat o'pka, balki boshqa nevrologik asoratlar ham rivojlanishi mumkin. Ba'zi odamlarda COVID infeksiyasidan haftalar va oylar o'tgach sodir bo'lgan ba'zi alomatlar periferik asab tizimi, markaziy asab tizimi (miya va orqa miya) va tananing boshqa barcha qismlari o'rtasida signallarni yuboradigan keng aloqa tarmog'i buzilganligini ko'rsatadi.

Maqsad: Koronavirus etiologiyasining polinevropatiyasi bo'lgan bemorlarning klinik va nevrologik xususiyatlarini baholash.

Usullari: Tadqiqotga polinevropatiyasi bo'lgan 62 bemor, koronavirus kasalligi bilan og'rigan 32 polinevropatiyalı bemorning asosiy guruhi va polinevropatiyasi bo'lgan 30 bemor ishtirok etdi.

Natijalar: Tadqiqotga qo'shilish vaqtida bemorlarning shikoyatlarida asosiy guruhdagi bemorlarning 97 foizida va taqqoslash guruhining 95 foizida hissiy buzilishlar, uyqusizlik, zaiflik va ish faoliyatini pasaytirish belgilari ustunlik qildi.

Xulosa: O'tkazilgan klinik va nevrologik tahlillar shuni ko'rsatadiki, polinevropatiya bilan koronavirus kasalligi bilan og'riganidan keyin nevrologik alomatlar kuchayadi va bemorlarni joriy etish va kompleks davolash uchun maqsadli taktika talab qiladi.

Kalit so'zlar: polinevropatiya, nevrologik alomatlar, asoratlar, COVID-19.

INTRODUCTION

A polyneuropathy is a diffuse peripheral nerve disorder that is not confined to the distribution of a single nerve or a single limb and typically is relatively symmetrical bilaterally. One of the complications of COVID-19 is polyneuropathy (Damian Mc Namara, 2020). The most widely accepted scale for a quantitative evaluation of polyneuropathy is the National Cancer Institute -Common Toxicity Criteria score, Version 4.0 (WHO criteria: / NCI-CTC scale:) from

grade 0 (mild) to grade 4 (life-threatening or degree of physical disability and mental retardation). At grade 1, moderate disturbances appear like paresthesia, mild pain. Grade 2 implies a functional disorder, moderate pain, limiting instrumental ADL. Grade 3 – severe pain, limiting self-care ADL and 4 - deterioration in the quality of daily life of patients, that is, disability (J. Majersik, V. Reddy, 2020; O Koyuncu, I. Hogue, I. Enquist, 2020).

Symptoms of polyneuropathy may appear suddenly or develop over time and become chronic, depending on the cause of the disease. Since the pathophysiology and symptoms of the disease are closely related, polyneuropathies are usually classified according to the substrate of the lesion: 1. Myelin - is an insulating layer, or sheath that forms around nerves, including those in the brain and spinal cord. It is made up of protein and fatty substances. This myelin sheath allows electrical impulses to transmit quickly and efficiently along the nerve cells. If myelin is damaged, these impulses slow down. 2. Vessels of nerves. 3. Axon – nerve fiber, the function of the axon is to transmit information to different neurons, muscles, and glands. Demyelinating polyneuropathies often develop as a result of a parainfectious immune response triggered by encapsulated bacteria (eg, *Campylobacter* sp), viruses (eg, enteric or influenza viruses, HIV), or vaccines (eg, influenza vaccine). Presumably, antigens in these agents cross react with antigens in the peripheral nervous system, causing an immune response (cellular, humoral, or both) that culminates in varying degrees of myelin dysfunction. (Alessandro P Burlina, 2011).

Purpose of the study. To evaluate the clinical and neurological characteristics of patients with polyneuropathies of coronavirus etiology.

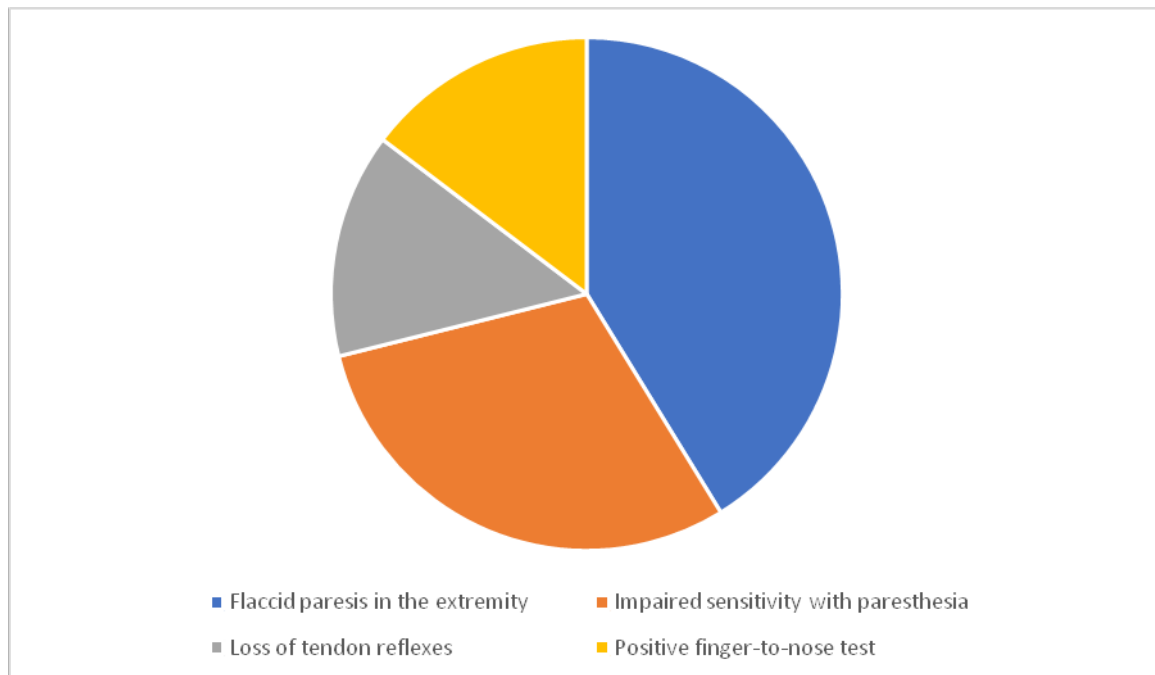
Materials and research methods. The study included 62 patients with polyneuropathies, the main group of 32 patients with polyneuropathies who underwent coronavirus disease and 30 patients with polyneuropathies. Criteria for inclusion in the study were: the age of patients from 40 to 70 years established diagnosis of polyneuropathy of coronavirus etiology. Inclusion required no known prior neuropathy or risks plus confirmation of SARS-CoV-2 infection according to guidelines of the World Health Organization (WHO). COVID severity classification followed WHO guidelines. Inclusion required meeting the WHO definition of long COVID (onset of symptoms within 90 days of the first day of COVID symptoms that last for >2 months).1 Participants were enrolled upon COVID confirmation and neuromuscular referral before record review or most testing and treatment.

Results and its discussion. At the time of inclusion in the study, patients' complaints were dominated by sensory disturbances, signs of numbness, weakness and decreased performance in 97% of patients in the main group and 95% of the comparison group, fatigue in 99% and 90%, patients complained of numbness in 94% and 90% , weakness in the lower limb, and then after 2-3 days in the upper limb in 76% and 60%, autonomic dysfunction with fluctuations in blood pressure, impaired secretion of antidiuretic hormone, arrhythmias, blockage of the gastrointestinal tract in 66% and 60% of the examined patients with polyneuropathies who underwent coronavirus disease.

Table 1 shows the results of study patient's complaints in main group and comparison group

Complaints	Main group (32 p)	Comparison group (30 p)
Fatigue	99%	90%
Numbness	94%	90%
Weakness of the limbs	76%	60%
Other complaints	66%	60%

The diagram 1 illustrates results of focal neurological analysis in main group who underwent COVID 19



Analysis of focal neurological symptoms showed: flaccid paresis in the extremity in 87% and 76%, signs of impaired sensitivity with paresthesia in 63% and 60% of the examined. Loss of tendon reflexes in 30% and 22%, intention when performing a finger-to-nose test in 31% and 25%, respectively, in patients with polyneuropathies after coronavirus disease. Neuromuscular evaluations proved useful in most of these patients with long COVID. However some symptoms, exam changes and test results may have been false-negative, given that assessments were not often optimally timed and many patients reported care delays. This reported case of multifocal motor neuropathy increases the spectrum of COVID-associated dysimmune neuropathies. Critical illness neuropathy—reported in approximately 10% of intubated patients with COVID—is attributed to various prolonged insults including intense inflammation and nerve compressions. Inherent study limitations include bias toward referrals for sensory neuropathy and underpowering. The initial evaluations reported occurred at varying times during the illness and treatment, whereas longitudinal assessments at standardized intervals are ideal for diagnostic and treatment decisions. Timing also complicates analysis of blood testing for immune markers (not shown). We screened patients with newly diagnosed neuropathy for all common established causes of distal sensory neuropathy, including routinely measuring ANA, ESR, IgG anti-SS-A/SS-B antibodies, and complement components C3 and C4, the most productive markers of dysimmunity in initially idiopathic SFN.⁷ We did not detect evidence of Sjögren syndrome, and other inflammatory markers were only occasionally elevated. Interpretation is complex as early elevations could be nonspecifically associated with acute COVID, and many months later, inflammation and markers might have subsided leaving residual axonopathy as the proximate cause of current symptoms. Regeneration can take up to 2 years or be incomplete.

Conclusions. The conducted clinical and neurological analysis shows that with polyneuropathy there is an increase in neurological symptoms after suffering a coronavirus disease and requires targeted tactics for the introduction and complex treatment of patients. The future

neurological complications for COVID-19 survivors remain uncertain, and if this virus circulates among us for years to come, long-term effects may accumulate exponentially. A Comprehensive understanding of how COVID-19 affects the nervous system can provide a better framework for managing symptoms in this disease. We found that neuropathic pain increased in the post-COVID period. This article has highlighted the need for more long-term clinical follow-up data on patients who have had COVID-19 and polyneuropathy, and for attention to the management of symptoms. More extensive studies investigating polyneuropathy associated with COVID-19 will be useful.

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