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SCIATICA AND LUMBAGO IN HOSPITALIZED COVID-19 PATIENTS

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Clinical symptoms in patients infected with COVID-19 can vary from asymptomatic and very mild conditions to severe multi-organ failure, severe pneumonia and septic shock. Although relatively common in the non-COVID population, lumbago and sciatica in hospitalized COVID-19 patients have not been sufficiently investigated and reported in the scientific literature. Therefore, the aim of our research was to examine the frequency of sciatica and lumbago, as well as their characteristics in hospitalized COVID-19 patients. The research included 119 patients with confirmed COVID-19 infection with a Real-Time Polymerase Chain Reaction assay for SARS-Cov-2. The presence of sciatica and lumbago were assessed based on the anamnestic data, available medical records of patients and clinical examination. In our study a total number of 39 patients (68.42%) with a previous history of sciatica and lumbago had recurrence of lower back pain. On the other hand, in the group of patients without a previous history of sciatica and lumbago, 30 patients (48.38%) experienced lower back pain for the first time. There was a statistically significant relationship between a previous history of sciatica and lumbago and the recurrence in hospitalized Covid-19 patients (LR = 25.317; p = 0.000). Low back pain and sciatica in hospitalized COVID-19 patients correlate with the length of hospitalization, patient age and vaccination status. There was a high probability that patients with a previous history of lumbago and sciatica may experience a relapse during COVID-19 hospitalization. *Acta Medica Medianae 2023;62(1):36-41.*

Key words: *COVID-19, sciatica, low back pain, COVID-19 vaccines*

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Introduction

Coronavirus disease 2019 (COVID-19) is a highly contagious viral disease with variable clinical symptoms caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) (1, 2). Globally, there have been more than 600 million confirmed cases of COVID-19 since the beginning of the pandemic, while the World Health Organization has reported more than 6 million deaths from COVID-19 (3). Despite the rapid development of vaccines against SARS-CoV-2 with different mechanisms of action, the virus is prone to genetic evolution and adaptation to human hosts by mutations, which significantly hinders progress in the fight against the pandemic (1, 2).

Clinical symptoms in patients infected with COVID-19 vary from asymptomatic and very mild conditions to severe multi-organ failure, severe pneumonia and septic shock (2).

Patients are commonly present with fever, cough, shortness of breath, fatigue, dyspnea, dysgeusia, anorexia, nausea, malaise, myalgia, sputum production and headache. Furthermore, other clinical signs such as rhinorrhea, chest pain, hemoptysis, conjunctival congestion and vomiting are considered to be rare symptoms (4, 5).

The clinical diagnosis of sciatica (radicular pain or lumbosacral radicular syndrome) is based on pain that radiates along one or both legs, and may be accompanied by neurological deficit (6). It can be caused by nerve root compression that forms the sciatic nerve (L4-S1) due to a herniated intervertebral disc as well as the resulting inflammatory response. Less common etiological factors are spinal trauma, foraminal stenosis, synovial cysts and tumors (7, 8). Pain in the lower back (lumbago) can be neuropathic, nociceptive and nociplastic pain, while clinically, it can be manifested as non-specific pain in this area (9).

Given that the COVID-19 pandemic caused unprecedented changes in healthcare systems, the number of patients who underwent elective lumbar spine surgery was drastically lower during the pandemic, and patients had higher number of comorbidities and overall complications (10).

Although it is relatively common in the non-COVID population, low backache and sciatica in

hospitalized COVID-19 patients have not been sufficiently investigated and reported in the scientific literature. Therefore, the aim of our research was to examine the frequency of sciatica and lumbago, as well as their characteristics in hospitalized COVID-19 patients.

Patients and methods

The research was conducted as a prospective study at the COVID hospital-object 4 in the period from March 15, 2021 to January 4, 2022.

The research included 119 patients with confirmed COVID-19 infection with a Real-Time Polymerase Chain Reaction assay for SARS-Cov-2. The previously signed informed consent was obtained for each patient.

The patients included in the research were patients with a mild clinical presentation and without serious comorbidities (hospitalized patients with SpO2 > 90%, with X-ray signs of pneumonia, with or without signs of hypoxia on admission). They were under constant medical supervision, including regular measurement of body temperature, oxygen saturation, respiratory rate and diuresis. All patients included in the study were hospitalized for a minimum of 7 days.

Based on the presence of sciatica, the patients were divided into the following groups:

Group I: patients with a previous history of sciatica and lumbago

Group II: patients with the first onset of sciatica and lumbago

The presence of sciatica and lumbago were assessed based on the anamnestic data, available medical records of patients and clinical examination, which included straight leg raising test (Lazarevic/Lasegue test), Mingazzini test, dorsiflexion and plantar flexion of the foot, Neri's test, Menell's test, the presence of paresthesia along the legs and other sensibility disorders as well as loss of bowel or bladder control. The characteristics of sciatic pain and lumbago were assessed based on a numerical scale from 0 (no pain) to 10 (worst possible pain), while the patients self-reported the degree of pain.

All the patients were treated conservatively for their symptoms of sciatica and lumbago. Further diagnostic procedures due to back pain and sciatica and other therapeutical options were left for a period after the patients' recovery from the COVID-19 infection.

Statistical data processing

Data entry, tabulation and graphical presentation were performed by using MS Office 2016 Excel program. The results of statistical analysis are presented in tables. Statistical calculations were performed using SPSS program (version 26). Among the basic descriptive statistical parameters, standard statistical methods were used for qualitative and quantitative assessment of the results: absolute numbers, relative numbers (%), arithmetic mean ($\bar{x}$), standard deviation (SD), minimum and maximum values. The normality of the distribution of individual values was examined by Kolmogorov-Smirnov test. The χ^2 test was used to test the statistical significance of absolute frequency differences between samples. The statistical hypothesis was tested at the level of significance for the risk of $\alpha = 0.05$, i.e. the difference between the samples is considered significant if $p < 0.05$. Comparison of the arithmetic means of the two samples was performed by t-test. Multiple logistic regression analysis was used to assess the influence of multiple risk factors on the occurrence of lumbago and sciatica.

Results

In the study group of 119 COVID-19 infected patients who were hospitalized, we tried to determine the frequency and some characteristics of ishilagia and lumbago. The average age of the patients was 66.14 years (min 29; max 89), while there were 69 (58.98%) male and 50 (42.02%) female patients. The total number of unvaccinated patients was 109 (91.6%), while 6 patients were vaccinated with 2 doses of vaccine (5%) and 4 with only one dose of vaccine (3.4%) (Table 1.).

Table 1. Vaccination status of patients

Variable	Frequency	Percent
Fully vaccinated, but does not know which vaccine he/she received	2	1.7
No vaccines	109	91.6
Pfizer-BioNTech COVID-19 Vaccine 1 dose	1	0.8
Sinopharm [Vero Cell]-Inactivated 1 dose	2	1.7
Sinopharm [Vero Cell]-Inactivated 2 doses	4	3.3
The Oxford/AstraZeneca (ChAdOx1-S [recombinant] vaccine) COVID-19 vaccine- 1 dose	1	0.8
Total	119	100

In our study, a total of 39 patients (68.42%) with a previous history of sciatica and lumbago had recurrence of lower back pain. On the other hand, in the group of patients without a previous history of sciatica and lumbago, 30 patients (48.38%) experienced lower back pain for the first time (Table 2). There was a statistically significant relationship between a previous history of sciatica and lumbago and the recurrence in hospitalized Covid-19 patients (LR = 25.317; p = 0.000). The degree of sciatica and lower back pain did not change significantly in relation to the Covid-19 infection and hospitalization (t = 1.909; p = 0.59).

Table 2. Presence of current sciatica and lumbago versus the previous history

Variable	The patient has current sciatica and lumbago	The patient without current sciatica and lumbago	Total
Previous history of sciatica and lumbago	39	18	57
The patient has never had sciatica and lumbago	30	32	62
Total	69	50	119

Table 3. Comparison of vaccination status and previous history of sciatica and lumbago with the currently present sciatica and lumbago

Variables	Vaccination status		Hospitalization in patients with the previous history of sciatica/lumbago	
	F†	p	t‡	p
Current degree of sciatica/lumbago	1.884	0.103	1.909	0.59

Table 4. The influence of the tested parameters on the development of sciatica and lumbago (multiple logistic regression analysis)

Variable	OR	95%CI	p
Fever	0.754	0.181-3.453	0.790
Pharyngitis	0.815	0.183-3.641	0.789
Nonproductive cough	0.775	0.239-2.517	0.672
Productive cough	0.714	0.178-2.866	0.634
Fatigue	26.644	2.285-310.718	**0.009**
Dyspnea	0.718	0.186-2.764	0.630
Dysgeusia	14.840	0.594-370.931	0.100
Anosmia	0.042	0.001-1,324	0.072
Nausea	1.970	0.548-7.088	0.299
Myalgia	1.252	0.432-3.631	0.678
Headache	6.486	1.754-23.986	**0.005**
Neck pain	6.314	1.484-26.862	**0.013**
Diarrhea	0.497	0.081-3.039	0.449
Vomiting	1.083	0.079-14.900	0.952
Oxygen saturation	1.050	0.940-1.173	0.384
C-reactive protein	0.992	0.984-1.000	0.065
Previous use of favipiravir in the outpatient setting	0.813	0.129-5.138	0.825
Oxygen flow through the mask	1.062	0.909-1.214	0.446

The vaccination status of patients did not vary significantly between the group of patients with a previous history of sciatica and lumbago and the group of patients with current sciatica and lumbago (F = 1.884; p = 0.103) during hospitalization (Table 3).

Multiple logistic regression analysis showed a statistically significant influence of fatigue (p = 0.009), headache (p = 0.005) and neck pain (p = 0.013) on the occurrence of sciatica and lumbago (Table 4).

Discussion

Considering the available scientific literature in the Internet databases (MEDLINE, PubMed, Embase, ClinicalTrials.gov) and to the best of our knowledge, we did not come across any research that investigated the frequency of sciatica and

lumbago, as well as their characteristics in hospitalized COVID-19 patients.

It has been observed that older male patients, as well as obese patients, have an increased risk of hospitalization due to Covid-19 infection (11, 12, 13). It is assumed that elderly patients are more affected by viral infections due to a weaker immune system (14). On the other hand, the exact mechanism why men have a more severe COVID-19 infection during hospitalization is still not clarified, but it is suggested to be multifactorial (15). Some authors have noted that obese patients are hospitalized more often and have a worse clinical outcome (16). According to other authors, the risk of hospitalization was 17 times higher in the unvaccinated population (17).

The average age of the patients in our study was 66.14 years, while there were 69 (58.98%) male and 50 (42.02%) female patients. The total number of unvaccinated patients was 109 (91.6%), while 6 patients were vaccinated with 2 doses of vaccine (5%) and 4 with only one dose of vaccine (3.4%). These results of our research are consistent with the results of the aforementioned researches. The relationship between aging, degenerative processes, and lumbago with sciatica is still unclear. Aging-related degeneration of the intervertebral disc involves numerous inflammatory mediators and cytokines (18).

We found a statistically significant influence of fatigue ($p = 0.009$), headache ($p = 0.005$) and neck pain ($p = 0.013$) on the occurrence of sciatica with lumbago (Table 4). Headache, fatigue and neck pain are common symptoms of COVID-19 (4), but they are non-specific symptoms that also occur during other viral infections. Our results can be applied to all bed-rest related illnesses, where locomotor system is minimally active for a substantial period of time. The patients from our study were hospitalized for a minimum of 7 days, average 11.6. days. Both obesity and low level of physical activity are independent risk factors of radiating low back pain (19).

There was a high probability that patients with a history of sciatica and lumbago may experience it again during their stay in Covid Hospital and that patients without it would not (LR = 25.317; $p = 0.000$).

Patients with degenerative diseases of the lumbar spine, such as disc herniation, have elevated levels of IL-6, TNF-α and IFN-γ, but their increased values can also be found in patients with rheumatological diseases (20). In addition to the mechanical compression of lumbar nerve roots and sensory root ganglia by herniated discs, there is a chemical stimulus for creating pain in the sciatic leg, which could be prescribed to elevated concentrations of IL-1α and consequently Prostaglandin E2, after which the tissue becomes more sensitive to bradykinin (21). It has been proven that as a result of COVID-19 infection, the epithelium is damaged while IL-1α and IL-1β concentration increases. Elevated levels of IL-6, TNF-α and IFN-γ in COVID-19 patient could be significant in forming an overacting immune response, especially IL-6 (22). Despite this connection in elevated values of IL-6, IL-1α, TNF-α and IFN-γ the pathophysiological mechanism remains not fully elucidated, because their values are elevated in many other diseases. The correlation between systemically elevated cytokine values and local pain in patients is also unclear. On the other hand, some authors suggest that in disc herniation and neuropathic pain, the intensity of pain is proportional to the local elevation of cytokines (20).

In one study on sciatic nerves in animal models, it was shown that during infection with COVID-19, HCoV-OC43 polypeptides are secreted and lead to molecular mimicry of the myelin basic protein and consequent mechanical hypersensitivity of the sciatic nerve. The same authors therefore propose this mechanism of action of the COVID-19 virus as a potential pathophysiological explanation for the neuropathic effect (23). The authors of one case report reported a case of acute denervation in the left tibialis anterior muscle due to COVID-19 sciatic mononeuropathy (24).

Therefore, additional research is needed to clarify the pathophysiological association between lumbago and sciatica in patients with COVID-19.

Conclusion

Low back pain and sciatica in hospitalized COVID-19 patients correlate with the length of hospitalization, patient age and vaccination status. There was a high chance that patients with a previous history of lumbago and sciatica may experience a relapse during COVID-19 hospitalization. Additional research is needed in order to clarify in detail the pathophysiological mechanism of the sciatic pain and lumbago in COVID-19 patients.

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LUMBOISCHIALGIA KOD HOSPITALIZOVANIH BOLESNIKA ZARAŽENIH VIRUSOM COVID-19

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Klinička slika bolesnika sa infekcijom izazvanom virusom COVID-19 varira od asimptomatskih i veoma blagih stanja do oštećenja više organa, teške pneumonije i septičkog šoka. Iako se relativno često javlja u populaciji koja nije obolela od virusa COVID-19, nema dovoljno podataka o lumboischialgiji kod hospitalizovanih COVID-19 bolesnika u naučnoj literaturi. Stoga je cilj našeg istraživanja bio da ispitamo učestalost lumboischialgije, kao i njene karakteristike kod hospitalizovanih bolesnika zaraženih virusom COVID-19. Istraživanje je obuhvatilo 119 bolesnika sa potvrđenom infekcijom izazvanom viursom COVID-19 PCR testom za SARS-Cov-2. Prisustvo lumboischialgije procenjivano je na osnovu anamnestičkih podataka, dostupne medicinske dokumentacije i kliničkog pregleda bolesnika. U našoj studiji ukupno 39 pacijenata (68,42%) sa prethodnom istorijom lumboischialgije imalo je recidiv ove bolesti. Sa druge strane, u grupi bolesnika koji nikada ranije nisu imali lumboischialgiju, 30 bolesnika (48,38%) prvi put doživelo je ovu bolest. Utvrđena je statistički značajna veza između prethodne istorije lumboischialgije i recidiva lumboischialgije kod hospitalizovanih bolesnika sa COVID-19 virusom (LR = 25,317; p = 0,000). Bol sa lumboischialgičnim karakteristikama kod hospitalizovanih pacijenata sa COVID-19 virusom korelirao je sa dužinom hospitalizacije, uzrastom bolesnika i vakcinalnim statusom. Rezultati našeg istraživanja ukazuju na veliku šansu da bolesnici sa prethodnom istorijom lumboischialgije mogu doživeti recidiv tokom hospitalizacije zbog infekcije izazvane virusom COVID-19. *Acta Medica Medianae 2023;62(1): 36-41.*

Ključne reči: *COVID-19, lumboischialgia, COVID-19 vakcine*