

*Vaka Çalışması*

## **COVID-19 Nedeniyle Oluşan Nöropatik Ağrının Yönetimi: Bir Vaka Sunumu**

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### **Öz**

**Amaç:** Bu çalışma, COVID-19 sonrası oluşan nöropatik ağrılı bir vakanın yönetimini sunmayı amaçlamıştır.

**Gereç ve Yöntem:** 27 yaşında erkek hasta yüksek ateş, baş ağrısı, nefes darlığı ve halsizlik ile hastaneye başvurdu. Hastanın COVID-19 testi pozitif çıktı ve evde takip edilmeye başlandı. 8. haftadan sonra hasta kıyafetlerini giymekte güçlük, ısı değişikliklerine duyarlılık ve allodini şikayetleri ile nöropatik ağrı tanısıyla fizyoterapi ve rehabilitasyona yönlendirildi. Değerlendirmede, nöropatik ağrı tarama araçları ve Görsel Analog Skalası kullanıldı. Ağrılı alanlar Semmens Weinstein 15 g monofilament ile haritalandı. Tedavide pregabalin ile 6 hafta (günde iki kez, yaklaşık 1 saat) fizyoterapi (klasik masaj ve TENS) uygulandı.

**Bulgular:** Pregabalinle birlikte fizyoterapi uygulamaları hem de ağrı şiddetini hem de ağrı alanını azalttı.

**Sonuç:** COVID-19 nedeniyle oluşan nöropatik ağrıda fizyoterapi uygulamaları yararlıdır. Daha ileri çalışmalara ihtiyaç vardır.

**Anahtar kelimeler:** COVID-19, Nöropati, Pandemi, Fizik Tedavi Modaliteleri

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Case Study

## Management of the Neuropathic Pain due to COVID-19: A Case Report

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### Abstract

**Objectives:** This study aimed to present the management of a case with neuropathic pain after COVID-19.

**Materials and Methods:** A 27-year-old man presented to the hospital with a high fever, headache, dyspnea, and fatigue. COVID-19 test of the patient was positive and he started to be followed up at home. After the 8th week, the patient had complaints of difficulty in wearing his clothes, sensitivity to temperature changes, and allodynia and was referred to physiotherapy and rehabilitation with the diagnosis of neuropathic pain. Neuropathic pain screening tools and the Visual Analog Scale were used in the evaluation. Painful areas were mapped with Semmens Weinstein 15 g monofilament. In management, 6 weeks (twice a day, approximately 1 hour) of physiotherapy (classic massage and TENS) was applied with pregabalin.

**Results:** Physiotherapy applications with Pregabalin decreased both pain severity and pain area.

**Conclusion:** Physiotherapy applications are useful in neuropathic pain due to COVID-19. Further studies are needed.

**Keywords:** COVID-19, Neuropathy, Pandemics, Physical Therapy Modalities

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## **Introduction**

The severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) first emerged in Wuhan in 2019 and rapidly spread all over the world. The virus defined as COVID-19 was reported to be mostly affecting the respiratory system. However, several studies reported that COVID-19 affected the peripheral and neurological nervous system and that the number of neurological findings was gradually increasing. Coronaviruses are known to have neuroinvasive and neuropathic properties (Ellul et al., 2020). Neuropathic pain is one of the peripheral nervous system findings (Mao et al., 2020). Neuropathic pain is defined as ‘pain caused by a lesion or disease of the somatosensory nervous system’ by International Association for the Study of Pain. The management of neuropathic pain can be compelling. As other pains, biopsychosocial approaches may be preferred in the management and several options for drug treatment as part of an overall approach may be used to improve patients’ quality of life and function (Murnion, 2018).

Neurological complications occurring with the COVID-19 infection are increasing. Although neurological findings affect 36.4% of the patients infected with COVID-19, neuropathic pain cases are very rare (2.3%) (Mao et al., 2020). There are two studies defining the neuropathic pain due to COVID-19 (Aksan et al., 2020; Mao et al., 2020). Mao et al. defined neuropathic pain due to COVID-19 in their descriptive study, and there was no intervention against neuropathic pain in the study (Mao et al., 2020). In a previously case report only medication therapy was given to patients with neuropathy after COVID-19. Any physiotherapy techniques were not administered. The study revealed the positive effect of gabapentin on neuropathic pain (Aksan et al., 2020). There is no study on physiotherapy management of neuropathic pain due to COVID-19. In this study, a 6-week physiotherapy program was combined with pregabalin. The study revealed that the management resulted in significant improvements in neuropathic pain.

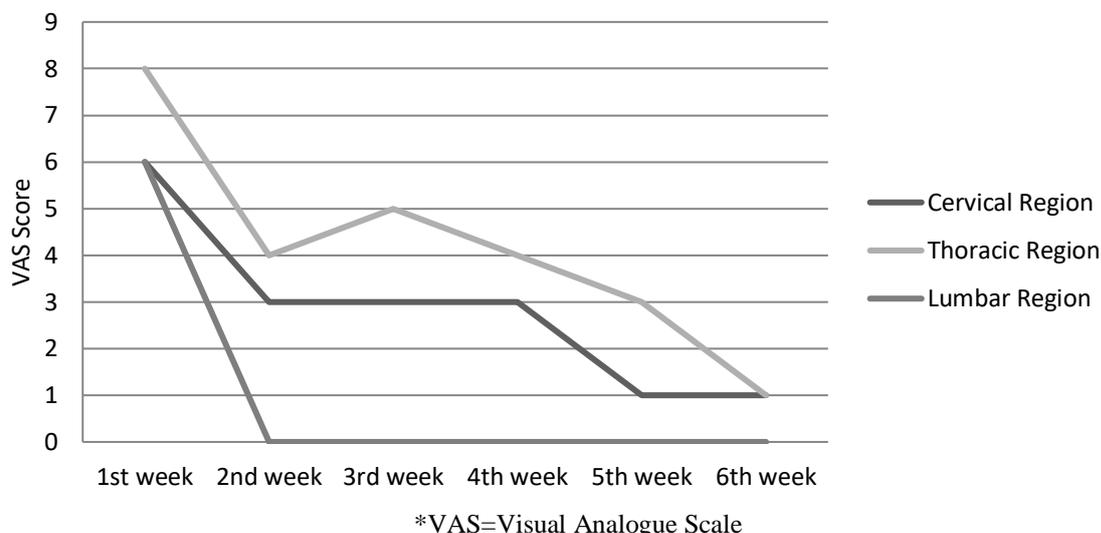
## **Case Report**

A 27-year-old man without any known chronic disease presented to a university hospital with high fever, headache, dyspnea, and fatigue. He received a reverse transcription-polymerase chain reaction (RT-PCR) test. His test was positive and prescribed with Favipiravir and Paracetamol. He was informed of the usage of the drugs and be treated at home. In the 2nd day, anosmia, ageusia, cough and widespread stinging body pain (in the cervical, thoracic and

lumbar regions, visual analog scale (VAS) 5) started and dyspnea increased. His fever got back to normal in the 3rd day. Cough, anosmia and ageusia disappeared in the 10th day. Dyspnea continued and the stinging pain was replaced by the burning pain. He presented again to the hospital with dyspnea and pain (VAS 4) and underwent thorax CT. According to CT, scattered, millimetric and non-specific solid parenchymal nodules were observed in both lungs parenchyma. He was prescribed with bronchodilator inhaler and DMARD. Breathing exercises were given as a home exercises. Dyspnea disappeared at the end of 8th week; however, burning pain increasingly continued in the cervical, thoracic and lumbar regions. Therefore, he was referred to Physical Medicine and Rehabilitation Outpatient Clinic. A detailed history of him was taken. A physical examination was run. He did not have pain radiating from the neck to the arms or from the back to the legs. Lower and upper extremity nerve stretch tests performed to support the diagnosis for radiculopathy were negative (straight leg raise, slump test, femoral nerve test, brachial plexus test and, spurling test). He did not have dermatomal sensation defect, myotomal muscle weakness and loss of segmental reflex. Also, no skin findings of Herpes Zoster were observed. No abnormal findings were found in the blood test. He had symmetric burning pain and allodynia complaints. He had difficulty in wearing his clothes and his pain increased in temperature changes. He was included in the physiotherapy program due to his neuropathic pain developing after COVID-19 and prescribed Pregabalin.

Neuropathic pain screening results were as follows: The Leeds Assessment of Neuropathic Symptoms & Signs Pain Scale (S-LANSS) score was 17 points, Pain Detect Questionnaire (PD-Q) score was 20 and Neuropathic Pain Questionnaire (NPQ) score was 1.06. These scores were the sign of neuropathic pain. The score of pain severity was 6 points in the cervical region, 8 in the thoracic region and 6 in the lumbar region according to VAS. Painful regions were mapped with Semmens Weinstein 15 g monofilament (mark 5.18). The pain areas were marked in the regions where the pain assessment would be performed (Spicher et al., 2016).

Pregabalin was 75 mg tablet 2x1- initiated and the patient's symptoms regressed, and the drug was tapered and discontinued during the follow-up period (lasted total of 3 months usage). Physiotherapy program was applied twice a day for 6 weeks. The classical massage (with soft touching) was applied to the entire back for approximately 45 minutes in a sitting position. Conventional TENS (30 min., 60 Hz, 100 µs) with paravertebral electrode placement were applied.



**Figure 1:** Weekly change of the pain severity according to the Visual Analogue Scale

A significant decrease was recorded in the severity of neuropathic pain. Pain severity of cervical and thoracic region according to VAS was decreased to 1 point and there was no pain in lumbar region (Figure 1). S-LANSS 12, PD-Q 10, and NPQ were 0.5 points after treatment, respectively (Table 1).

**Table 1:** Neuropathic pain screening tools' results of pre-treatment and post-treatment

Neuropathic pain screening tools	Pre-treatment	Post-treatment
<b>S-LANSS</b>	17	12
<b>PD-Q</b>	20	10
<b>NPQ</b>	1.06	0.5

\*S-LANSS= The Leeds Assessment of Neuropathic Symptoms & Signs Pain Scale; PD-Q= Pain Detect Questionnaire; NPQ= Neuropathic Pain Questionnaire

A reduction was observed in the pain area (Figure 2, pre- and post-treatment) after physiotherapy. There was no adverse effect of the treatment.

This study adhered to the principles of the Declaration of Helsinki. A written informed consent was obtained from the participant.



**Figure 2:** Mapping of pre-treatment and post-treatment pain areas

### **Discussion and Conclusion**

It was reported in several experimental studies and case reports that COVID-19 affected the peripheral and neurological nervous system and that the number of neurological findings were gradually increasing like in the other coronavirus outbreaks such as Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV) (Ellul et al., 2020). It is known that coronaviruses have neuroinvasive and neuropathic potential. The spike protein of SARS-CoV-2 virus dictates the tissue tropism by using the cell surface receptor, angiotensin-converting enzyme type 2 (ACE-2), in order to bind to the cells and invades many tissues such as nervous system tissue in that way. Nasal epithelial cells exhibit the highest ACE-2 expression (receptor for SARS-CoV-2) in the respiratory system (Gupta et al., 2020). Invasion of SARS-CoV-2 in the central nervous system can be explained with nasal mucosa, lamina cribrosa and olfactory bulbus or retrograde axonal transport. Neuropathic pain is one of peripheral nervous system findings due to COVID-19. Difference from other neuropathic pains, it is rare (Mao et al., 2020) while it has been reported that it does not respond to the treatments well and decreases the quality of life of the individuals (Ftiha et al., 2020). A previously case report revealed the positive effect of gabapentin on neuropathic pain however that did not include any physiotherapy management (Aksan et al., 2020). In this case report, a 6-week physiotherapy and rehabilitation program was combined with the use of pregabalin.

The study revealed significant improvements in neuropathic pain due to COVID-19.

A study revealed that opioid in the management of pain due to COVID-19 increased the incidence and severity of infection. Therefore, opioids aren't recommended in order to decrease the secondary infection risk (Widyadharm et al., 2020). There are still doubts about the use of ibuprofen and non-steroidal anti-inflammatory drugs (NSAIDs) in the management of fever and pain in patients suspected to have COVID-19. Also, acetaminophen, NSAIDs and opioids didn't reduce the pain therefore gabapentin was used in a case report in which neuropathic pain developed due to COVID-19. However, at the end of the study, slight improvements in pain intensity were obtained at the 4-week follow-up (Aksan et al., 2020). In this study, the patient received Pregabalin and the combined TENS and classic massage. Conventional TENS with paravertebral electrode placement and classic massage were applied to the patient twice a day for 6 weeks. A significant decrease was recorded in the pain severity and pain regions of the patients after a 6-week treatment. Compared with the other study, greater improvement was achieved, suggesting that improvement may be due to the application of physiotherapy and rehabilitation in addition to pregabalin. There are no study classic massage or TENS application against neuropathic pain due to COVID-19 however some studies supported the results of this study revealed their effects of them on common neuropathic pain. They suggested the beneficial results of TENS and classical massage in neuropathic pain (Buckenmaier et al., 2016; Gibson et al., 2017). TENS is used in the treatment of many various acute and chronic pain conditions and is based on the principle of pain relief through the delivery of electrical impulses via electrodes on the skin and stimulation of cutaneous nerves (the pain gate theory). Although the effect of TENS was at the low level of evidence in a systematic review most of the clinical studies revealed the effectiveness of TENS on neuropathic pain relief (Gibson et al., 2017). The studies asserted that proper stimulation properties (i.e. stimulation frequency and intensity) had an important role in improving the analgesic effects of TENS. The classic massage was thought to decrease the pain by affecting the opioid system (Buckenmaier et al., 2016) and it was reported in various studies that it relieved the pain in neuropathy (Sarisoy & Ovayolu, 2020). In addition, in some studies in the literature, classical massage was applied in allodynia and beneficial results were obtained (Dietz & Compton, 2015; Piovesan et al., 2007; Sherry et al., 1999).

One limitation of the study was the subjective tool's evaluation of pain severity and area. In addition, the study did not include a control case; since this is a case study, the results cannot

be generalized.

Consequently, TENS and classic massage with Pregabalin were successful in pain relief. There is no study including physiotherapy practices in the treatment of neuropathic pain due to COVID-19. Therefore, further studies are needed.

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The authors declare that the study have no financial support.

#### **Conflict of Interest**

The authors declare that they have no conflict of interest.

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