



Original Article

DOI: 10.36959/377/374

Chronic Pain after COVID-19: A Case Report

Paul L Lion IV*, Yong-Jian Lin and Howard L Rosner

Department of Anesthesiology, Cedars-Sinai Medical Center, Los Angeles, CA, United States



Abstract

COVID-19 was declared a global pandemic by the WHO in March of 2020. When the COVID-19 pandemic first started, much attention was focused on the respiratory manifestations of the disease. However, as the course of the pandemic continued, more and more attention has been paid to the neurological symptoms after infection with the SARS-CoV-2 virus. Despite this, there is little data with respect to sequelae of pain and musculoskeletal symptoms following infection. We present a case of a 52-year-old female who presented to our pain clinic with new pain symptoms after recovering from COVID-19, as well as worsening of her pre-existing hemi cranial pain. She reported new joint pains in her knees, shoulders, and ankles, as well as new neck pain with benign cervical MRI. It remains unclear how the mechanism of infection with SARS-CoV-2 can produce chronic pain in patients. The ACE2 receptor which is present in skeletal muscle, as well as the central and peripheral nervous system is believed to play a role - nociceptor sensitization may also play a role in development of pain symptoms after infection. Further research is needed to better understand the long-term effects of COVID-19, particularly with respect to development of chronic pain. It remains unclear what role disease severity and underlying medical comorbidities may have on the development of pain symptoms following infection with SARS-CoV-2.

Keywords

Pain, Chronic pain, COVID-19, SARS-Cov-2, COVID pain

Introduction

First identified in Wuhan, China in December of 2019, the coronavirus disease 2019 (COVID-19) was declared a global pandemic by the World Health Organization (WHO) on March 11, 2020 [1]. As of mid-May 2022, there have been over 521.9 million cases globally, including over six million deaths due to COVID-19 [2]. While much of the early focus of symptoms from infection with the SARS-CoV-2 virus was placed on the respiratory manifestations, some authors began to elucidate the neurological symptoms, including skeletal muscle injury and nerve pain [3]. Mo, et al. reported in one retrospective study of 155 patients that 61.0% percent of patients reported myalgia or arthralgia symptoms with infection [4]. Other authors have discussed musculoskeletal complications of COVID-19, including myositis, neuropathy, arthropathy, and soft tissue abnormalities [5]. As more and more people recover from the acute phase of infection with COVID-19, we continue to see a wide variety of symptoms, including chronic pain, from so-called "long COVID". Particularly with respect to pain and musculoskeletal symptoms, not much data has been published on the subject. We present a case in which a patient who was infected with COVID-19 subsequently developed new pain symptoms, as well as worsening of chronic headache pain.

Case Presentation

A 52-year-old female presented to our clinic with reports

of left-sided hemicranial pain for approximately three years, as well as left sided neck pain, with pain radiating down her left arm. She described her head pain as involving the occipital area, exclusively on the left side. She described the pain as "grabbing" and would occasionally migrate anteriorly. She had denied any cranial trauma or history of rashes in the area, but did report some hypersensitivity of the scalp on the left side. The patient reported she was diagnosed with COVID-19 in November of 2020. Since then, her headaches had gradually increased in pain by about 60% by the time she was initially evaluated in our clinic in April of 2021. She also stated that this left sided neck pain radiating into her left shoulder and into her left hand, began approximately two months after she was diagnosed with COVID-19. This pain continued to worsen before she was evaluated in our clinic. She described her pain as severe, stabbing, sharp and aching. The patient also reported having bilateral joint

***Corresponding author:** Paul L Lion IV, Department of Anesthesiology, Cedars-Sinai Medical Center, 444 S. San Vicente Blvd #1101, Los Angeles, CA, 90048, United States, Tel: +1-310-423-9600

Accepted: September 22, 2022

Published online: September 24, 2022

Citation: Lion PL, Yong-Jian L, Rosner HL (2022) Chronic Pain after COVID-19: A Case Report. J Clin Anesth Pain Manag 6(2):304-306

pain in her knees, shoulders, and ankles. This joint pain also began approximately two months after she was diagnosed with COVID-19. She had denied any history of joint pains and trauma before this time.

The patient's past medical history was significant for obesity (BMI of 35.9) and type 2 diabetes on metformin, dapagliflozin, and insulin. She was diagnosed with COVID-19 in November of 2020 – with primary symptoms of cough and fever. She also reported headaches during the time of infection, but they were not significantly changed from her usual pre-COVID-19 headaches. She did not require hospitalization after infection.

Oral analgesics at presentation, five months post-infection, included cyclobenzaprine and NSAIDs. Her physical exam showed normal cervical spine range of motion and local tenderness to palpation over the left trapezius, left splenius capitis, and left occipitalis. Strength was preserved in the bilateral upper extremities. Imaging studies included a brain MRI with and without contrast from June of 2020 which was without any abnormalities. A cervical spine MRI without contrast from March of 2021 demonstrated no abnormalities.

The patient was started on duloxetine 30 mg daily, in addition to the cyclobenzaprine and NSAIDs she was taking. She was referred to physical therapy, and an orofacial pain specialist. Approximately one month after her initial visit, she had a left lesser occipital nerve block done for suspected occipital neuralgia. She reported no immediate relief following injection but had 20% relief in her headache pain approximately two weeks after the procedure. Her NSAID was then replaced with indomethacin 50 mg three times daily which significantly improved her pain, but she developed highly labile blood glucose levels and had to stop the medication - she resumed her prior NSAID. She continues to be followed in pain clinic with persistent left hemi cranial pain, left neck pain with radicular symptoms, as well as bilateral joint pain.

Discussion

The mechanism by which SARS-CoV-2 infection causes pain is not entirely clear. The SARS-CoV-2 virus is known to infect cells by binding to the angiotensin-converting enzyme 2 (ACE2) receptor [6]. The ACE2 receptor is expressed in both skeletal muscle, as well as the central and peripheral nervous system [7], which could explain the role of the virus in developing pain.

Systemic inflammation could also play a role in the musculoskeletal pain, given elevated known nociceptive mediators that result from infection [8].

Long-term post-viral pain syndromes are not without precedent, given the case reports of Guillain-Barré syndrome [9] and polyneuritis cranialis [10]. A small retrospective study of patients who developed *Severe Acute Respiratory Syndrome* (SARS), another illness caused by a coronavirus (SARS-CoV-1), demonstrated long-term effects lasting for almost 20 months following infection, with symptoms including chronic fatigue, diffuse myalgia, weakness, depression, and non-restorative sleep [11]. Given that SARS-CoV-1 and SARS-CoV-2 share 70%

genetic similarity [12], it seems likely that a post-viral pain syndrome would also emerge with SARS-CoV-2.

McFarland, et al. identified several transcriptional changes associated with infection by SARS-CoV-2 which could potentially affect nociceptor sensitization. One of these changes is oncostatin-M (OSM), a cytokine associated with development of neuropathic pain [8]. While it is unclear if the virus can infect nociceptors, the presence of ACE2 in the dorsal root ganglia makes it appear possible, although we do not fully understand the long-term effects [8].

Karaarslan, et al. conducted a single-center cohort study looking at rheumatologic and musculoskeletal symptoms in COVID-19 survivors at 3 months and 6 months following hospitalization [13]. Patients admitted or transferred to the ICU at any point were excluded from this study. At 3 months, 40.6% of patients had myalgia and 39.2% of patients had joint pains. At 6 months, 18.6% had joint pain, and 15.1% had myalgia. The joint pain was mostly widespread, but in those reporting more localized pain, joint pain was most often in the knee, ankle or shoulder. Other pain symptoms reported were low back pain, back pain excluding the lower back, and neck pain. With respect to headaches in this study, 24.4% and 9.5% of patients reported headaches at 3 months and 6 months, respectively [13].

Other studies have also looked at musculoskeletal symptoms following recovery from infection, including a case series by Carfi, et al. which showed persistent joint pain in 27.3% of patients approximately 60 days after COVID-19 symptom onset [14]. An observational cohort study from Dennis, et al. looked at recovered patients approximately 140 days after initial COVID-19 symptoms, which demonstrated muscle aches in 86.5% of patients, as well as joint pain in 78% of patients [15]. Another study conducted by Xiong, et al. was a cohort study in hospitalized COVID-19 patients approximately 100 days post-discharge, which demonstrated a prevalence of myalgia of 4.5% and arthralgia of 7.6% [16].

Based on the current published data, it appears that post-COVID joint pains and myalgias are not infrequently reported in patients who recover from COVID-19. There is a large variation in reported prevalence of pain and myalgia symptoms, with mostly small studies and case reports discussing symptoms following recovery. While many of the published studies have focused on pain symptoms of hospitalized patients, our patient developed a relatively mild case of COVID-19, which did not require hospitalization. The joint pains in her bilateral knees, shoulders, and ankles were all new symptoms that arose approximately two months after infection, as was her left sided neck pain with radiculopathy. Imaging studies were unremarkable. Infection with SARS-CoV-2 also worsened her chronic left sided head pain. While most of the published studies demonstrating persistent pain symptoms following infection have focused on hospitalized patients, it remains unclear what role disease severity may play in not only the types of post-COVID pain symptoms but also their duration.

Conclusion

While the short-term effects of infection with SARS-CoV-2

have been more obvious, it really remains to be seen what the long-lasting impact of infection will be. We believe with time that more patients will be encountered in clinical practice with reports of a variety of pain and other musculoskeletal ailments following infection. Much remains to be elucidated regarding the etiology and mechanism of COVID-19 related pain, as does determining those patients who are most at risk of developing pain sequelae after infection with SARS-CoV-2. We suspect that there will be an increase in both patients with new pain symptoms after infection, as well as patients with pre-existing chronic pain who have exacerbation of their pain symptoms after infection. It also remains rather nebulous what role medical comorbidities may have on the development and persistence of pain symptoms after infection with SARS-CoV-2. Given that patients with type II diabetes, like the patient in this case, are already at risk for more severe disease following infection [17]. Future research could examine whether a history of type II diabetes or other medical comorbidities would also predispose to increased risk of developing chronic pain after having COVID-19.

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DOI: 10.36959/377/374