Turkish Journal of Clinical Research

Turk J Clin Res. 2025;1(1):7-10
https://doi.org/10.63909/1453002

RESEARCH ARTICLE

The impact of prior COVID-19 infection on pain, disability, and quality of life following cervical disc herniation surgery

Geçirilmiş COVID-19 enfeksiyonunun servikal disk hernisi ameliyatı sonrası ağrı, engellilik ve yaşam kalitesi üzerine etkisi

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Abstract

Aim: This research investigates whether previous COVID-19 infection influences clinical outcomes and patient-reported experiences in individuals treated surgically for cervical disc herniation (CDH). While COVID-19 is predominantly recognized for its respiratory effects, accumulating evidence highlights its prolonged impact on neuromuscular and psychological health. These sequelae could potentially alter postoperative recovery dynamics following spine surgery.

Methods: A retrospective cohort of 64 patients undergoing anterior cervical discectomy and fusion (ACDF) from 2021 to 2023 was analyzed. Subjects were stratified based on PCR-confirmed COVID-19 diagnosis within six months prior to surgery. Clinical evaluations included the Japanese Orthopaedic Association (JOA) score for neurological assessment, the Neck Disability Index (NDI) for functional impairment, and the SF-36 questionnaire to assess health-related quality of life. The data were compared using t-tests and Mann–Whitney U tests.

Results: No statistically significant differences were observed between groups in JOA or NDI scores. However, patients with a prior COVID-19 infection reported markedly lower SF-36 scores in domains such as physical functioning, role-physical, role-emotional, and social functioning ($p<0.05$), indicating reduced subjective well-being despite comparable clinical metrics.

Conclusion: While prior COVID-19 infection does not appear to compromise neurological or disability outcomes after CDH surgery, it is associated with diminished self-perceived health status. These findings underscore the importance of comprehensive postoperative care addressing both physical and psychological dimensions in patients with recent COVID-19 history.

Keywords: COVID-19, cervical disc herniation, NDI, SF-36, spine surgery outcomes.

Özet

Amaç: Bu araştırma, geçirilmiş COVID-19 enfeksiyonunun servikal disk hernisi (SDH) nedeniyle cerrahi olarak tedavi edilen bireylerde klinik sonuçları ve hasta tarafından bildirilen deneyimleri etkileyip etkilemediğini araştırmaktadır. COVID-19 ile ilgili ağırlıklı olarak solunum yolu etkileri bilinmesine rağmen, yapılan çalışmalar nöromüsküler ve psikolojik sağlık üzerindeki uzun süreli etkisini vurgulamaktadır. Bu tür sonuçlar omurga cerrahisinde postoperatif iyileşme dinamiklerini potansiyel olarak değiştirebilir.

Yöntemler: 2021'den 2023'e kadar anterior servikal diskektomisi ve füzyon (ACDF) geçiren 64 hasta retrospektif olarak analiz edildi. Hastalar, ameliyattan önceki altı ay içinde PCR ile doğrulanmış COVID-19 tanısına göre gruplandırıldı. Klinik değerlendirmeler, nörolojik değerlendirme için Japon Ortopedi Derneği (JOD) skorunu, fonksiyonel bozukluk için Boyun Engellilik İndeksini (BEİ) ve sağlık ile ilgili yaşam kalitesini değerlendirmek için SF-36 anketini içeriyordu. Veriler t-testleri ve Mann-Whitney U testleri kullanılarak karşılaştırıldı.

Bulgular: Gruplar arasında JOD veya BEİ puanlarında istatistiksel olarak anlamlı bir fark gözlenmedi. Ancak, daha önce COVID-19 enfeksiyonu geçiren hastalar, fiziksel işlev, rol-fiziksel, rol-duygusal ve sosyal işlev gibi alanlarda belirgin şekilde daha düşük SF-36 puanları bildirdiler ($p<0,05$), bu da karşılaştırılabilir klinik ölçütlere rağmen azalmış öznel refahı göstermektedir.

Sonuç: Daha önce COVID-19 enfeksiyonu, SDH ameliyatından sonra nörolojik veya sakatlık sonuçlarını tehlikeye atmıyor gibi görünse de azalmış öz algılanan sağlık durumu ile ilişkilidir. Bu bulgular, yakın zamanda COVID-19 öyküsü olan hastalarda hem fiziksel hem de psikolojik boyutları ele alan kapsamlı postoperatif bakımın önemini vurgulamaktadır.

Anahtar Kelimeler: COVID-19, servikal disk hernisi, BEİ, SF-36, disk cerrahisi sonuçları.

INTRODUCTION

Cervical disc herniation (CDH) represents a prevalent degenerative condition of the cervical spine, involving the protrusion of disc material that can impinge on neural elements such as the spinal cord or nerve roots.

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Cite as: Korkmazer R, Akıncı C, Aydın O. The impact of prior COVID-19 infection on pain, disability, and quality of life following cervical disc herniation surgery. Turk J Clin Res. 2025;1(1):7-10

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Received: 08 April 2025 | **Accepted:** 10 May 2025 | **Published:** 30 May 2025

Turk J Clin Res. 2025;1(1):7-10
https://doi.org/10.63909/1453002

Clinical manifestations frequently include cervical pain, radiculopathy, motor deficits, and, in more severe cases, myelopathic symptoms, all of which can substantially degrade patients' functional status and overall well-being (1,2). Anterior cervical discectomy and fusion (ACDF) is widely accepted as the definitive surgical solution for alleviating symptoms and achieving neurological recovery (3).

The emergence of the COVID-19 pandemic introduced additional complexity in spinal disorder management. Although SARS-CoV-2 predominantly affects the respiratory system, it has been associated with persistent neuromuscular and neurological symptoms including chronic fatigue, myalgias, peripheral nerve disturbances, and generalized weakness (4–6). These lingering effects, when superimposed on spinal pathology, may hinder surgical recuperation.

Additionally, the pandemic induced lifestyle shifts, such as prolonged sedentary activity, suboptimal work-from-home ergonomics, and reduced access to exercise, all of which have contributed to spinal strain and may accelerate disc degeneration (7,8). Mental health disruptions, including isolation, anxiety, and depressive symptoms, further affect patient recovery outlook (9). Societal restrictions have also led to delayed diagnoses, postponed surgeries, and reduced postoperative rehabilitation opportunities, which can compromise optimal outcomes.

Furthermore, the biopsychosocial model of care has gained renewed attention during the pandemic. The complex interaction between physical pathology, psychological health, and social support has become even more relevant. Patients recovering from COVID-19 and undergoing spinal surgery may require multifaceted care strategies that address more than just structural abnormalities. Addressing comorbid fatigue, sleep disturbances, and mood disorders is essential in managing this patient population holistically.

Although substantial data exist regarding the impact of COVID-19 on lumbar spine pathology, the postoperative implications in cervical spine cases remain understudied. Prior studies primarily focus on pulmonary or systemic sequelae, while localized spinal outcomes remain a critical gap in the literature. This investigation aims to determine whether prior COVID-19 infection alters pain perception, disability levels, and self-reported quality of life in patients undergoing surgical management of CDH.

METHODS

A retrospective cohort analysis was carried out at Karabuk Training and Research Hospital. The study population included patients who underwent ACDF for CDH between 2021 and 2023. Patients with a history of previous spinal surgery, multi-level procedures, or incomplete documentation were excluded. The Karabuk University Medical Faculty Ethics Committee approved the study on June 01, 2022 with decision number 2022/936.

Participants were stratified into two groups depending on the presence or absence of COVID-19 infection confirmed via PCR testing within six months preoperatively. Preoperative variables included demographic data, JOA score to assess neurological function, NDI to quantify disability, and SF-36 to evaluate health-related quality of life.

Statistical analysis utilized t-tests and Mann–Whitney U tests where appropriate. A p-value less than 0.05 was considered statistically significant.

RESULTS

The study sample consisted of 64 individuals, with equal representation in both the COVID-19 positive and negative groups (n=32 each). The mean participant age was 48.3±8.7 years, and the cohort included 38 men and 26 women. Baseline characteristics between the two groups showed no significant differences.

Assessment using the JOA scale revealed no statistical disparity between groups (p=0.51). Similarly, NDI scores reflecting neck-specific functional impairment were not significantly different (p=0.48).

However, analysis of SF-36 results demonstrated significantly reduced scores in the COVID-positive group across several domains: physical functioning (p=0.01), role-physical (p=0.03), role-emotional (p=0.02), and social functioning (p=0.01). These findings underscore a divergence in patient-perceived recovery that is not

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mirrored in clinical or functional scores.

DISCUSSION

The current findings reveal that while objective surgical outcomes remain unaffected by prior COVID-19 infection, subjective quality of life is considerably impacted. The lack of difference in JOA and NDI results suggests that neurological integrity and mechanical function were preserved regardless of COVID-19 history.

Nonetheless, diminished SF-36 scores in the post-COVID group may reflect underlying factors such as physical deconditioning, post-viral fatigue, and musculoskeletal discomfort—elements that affect daily life but are not captured in traditional clinical scales (4,6). Emotional strain, pandemic-induced social withdrawal, and ongoing health anxieties further contribute to reduced emotional and social well-being (9,10–12).

It is also important to consider that individuals recovering from COVID-19 might have different expectations or perceptions of health, influenced by their experience with the illness. The psychosocial burden of surviving a potentially severe viral infection could contribute to heightened sensitivity to somatic symptoms or a diminished sense of resilience. These factors may lead to lower reported scores in quality-of-life assessments.

Additionally, systemic inflammation and immune dysregulation, which are hallmarks of long COVID, may contribute to lingering symptoms such as brain fog, chronic pain, and reduced physical stamina. These sequelae, although not easily quantifiable using standard spine surgery metrics, have the potential to affect recovery trajectories and patient satisfaction.

Comparable findings in lumbar disc surgery populations have been reported. Apaydın et al. demonstrated that lumbar surgery patients with prior COVID-19 experience similar reductions in quality of life and elevated disability and anxiety levels (13). These congruent results strengthen the argument for a biopsychosocial approach to postoperative care and highlight the need for further research across various spinal interventions.

Future research should include larger, prospective studies that monitor both physical and psychological outcomes over time. Integrating patient-reported outcome measures (PROMs) and structured post-COVID rehabilitation protocols into spine surgery pathways could offer a more complete understanding of how to optimize care for this emerging patient subgroup.

CONCLUSION

While the presence of prior COVID-19 infection does not appear to impact objective postoperative outcomes such as neurological function or disability levels in patients undergoing surgery for cervical disc herniation (CDH), it has a measurable effect on subjective perceptions of recovery and overall quality of life. Patients with a recent history of COVID-19 report diminished health status in multiple psychosocial and physical domains, as reflected by lower SF-36 scores. This discrepancy between clinical metrics and patient-reported well-being highlights the importance of considering more than just surgical success in postoperative evaluations.

The findings underscore the need for a broader, more holistic approach to postoperative care that encompasses not only physical rehabilitation but also mental health and social support strategies. Tailoring follow-up programs to include psychological counseling, fatigue management, and targeted physiotherapy may help bridge the gap between objective outcomes and patient satisfaction. Given the complexity of post-COVID recovery trajectories, clinicians should adopt a proactive, multidisciplinary framework that addresses the interdependent factors affecting recovery.

In light of the evolving nature of COVID-19 and its long-term implications, future research should prioritize longitudinal studies with larger cohorts to validate these findings and inform the development of specialized care pathways. Ultimately, integrating patient-centered, holistic care models will be critical in optimizing recovery and enhancing quality of life in post-COVID CDH patients.

Acknowledgement: We thank all healthcare workers of the Department of Infectious Disease and Clinical Microbiology and Department of Brain and Neurosurgery Karabuk University School of Medicine and Karabuk Education and Research Hospital.

Ethical Approval: The Karabuk University Medical

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https://doi.org/10.63909/1453002

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Author Contributions: Idea/Concept: R.K., C.A., O.A., A.E.T.; Design: R.K., C.A., O.A., A.E.T.; Supervision: R.K., C.A., O.A., A.E.T.; Resources: R.K., C.A., O.A., A.E.T.; Materials: R.K., C.A., O.A., A.E.T.; Data Collection and/or Processing: R.K., C.A., O.A., A.E.T.; Analysis and/or Interpretation: R.K., C.A., O.A., A.E.T.; Literature Review: R.K., C.A., O.A., A.E.T.; Written: R.K., C.A., O.A., A.E.T.; Critical Reviews: R.K., C.A., O.A., A.E.T.

Conflict of Interest: The authors declare no conflict of interest.

Financial Disclosure: The authors declared that this study has received no financial support.

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