

Management of Spinal Cord Injury During COVID-19 Era



Azharuddin^{1*}, Diaz Novera²

¹Orthopaedic Surgery Division,
Department of Surgery, Faculty of
Medicine, Universitas Syiah Kuala,
Zainoel Abidin General Hospital, Banda
Aceh, Indonesia;

²Emergency Department, Nanggroe-
Madani Medical Centre, Aceh Besar,
Indonesia;

*Corresponding author:

Azharuddin;
Orthopaedic Surgery Division,
Department of Surgery, Faculty of
Medicine, Universitas Syiah Kuala,
Zainoel Abidin General Hospital, Banda
Aceh, Indonesia;
azharspbo_kspine@yahoo.com

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ABSTRACT

Coronavirus disease (COVID-19) was declared a pandemic in March 2020 and has the potential to overload health system, compromise hospital staffs and use up essential hospital supplies. Patients with Spinal Cord Injuries (SCI) are classified as patient with disability and has increased morbidity from COVID-19 due to physiological changes from the nature of pathology, subsequently their clinical and social characteristics puts them in high risk of contracting COVID-19. Patients with SCI might present different symptoms of COVID-19 than others. Weakness in thoraco-abdominal and diaphragm muscles might impair cough, reduce lung volumes, and reduce flow rates. Interrupted pathway between hypothalamus and efferent nerves (sympathetic and motoric) might results in temperature dysregulation (poikilothermia) and dysfunction of febrile response. Patients with injuries at higher levels would present with more severe symptoms. The pandemic of COVID-19 further complex the situation of delivering adequate and dignified treatment. Therefore, the main goal is for complete avoidance of infection in this specific population and should be considered with high index of suspicion when mild symptoms of COVID-19 are present. This vulnerable group of patients deserves more attention when presented with extraordinary situations such as pandemics or earthquakes. This overview summarizes the symptom and pathophysiology of SCI in COVID-19 pandemic.

Keywords: spine, injury, pandemic era, strategy.

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Coronavirus Disease 2019 (COVID-19) is a disease caused by Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) that was declared pandemic by World Health Organization (WHO) in March 2020. COVID-19 has the potential to overload health systems, compromise hospital staffs, and deplete essential supplies. The pandemic has resulted in unprecedented impact on global scale and increased the concerns and anxiety of professionals and patients with SCI.¹

Patients with spinal cord injuries (SCI) are at high risk of COVID-19 because of their clinical and social characteristics.¹ Patients with disabilities, such as patients with spinal cord injuries and diseases (SCI/D), are associated with the extensive need of caregiver support, regular equipment usage and increased vulnerability towards pulmonary infection. This specific population requires special planning, attention, and consideration.²

Patients with SCI/D has altered physiological status that results in increased risk of morbidity of COVID-19

and may mask clinical manifestation of the disease.³ Thoraco-abdominal and diaphragm muscle weakness in these patients may result in impaired cough, reduced lung volumes, and reduced flow rates.⁴ Patients may also experience poikilothermy and dysfunction of febrile response due to the interruption of pathways between hypothalamus and efferent nerves. These symptoms are found to be more severe in neurological injuries at higher levels.⁵

SCI may induce systemic immune depression due to noradrenergic overactivation and excess glucocorticoid release via stimulation of the hypothalamic-pituitary-adrenal axis.⁶ SCI may also result in immunosuppression as transmission from the brain to respond towards an infection is delayed or impaired. The delayed immune response results in chronic inflammation as the body could not correct the affected area. The adapted homeostasis in response of chronic inflammation further results in immunosuppression. Immunosuppressed individuals are at high risk of severe cases

of COVID-19.⁶

Patients with SCI/D at high level frequently requires ventilatory support and tracheostomy which make assessment of anosmia and dysgeusia, pathognomonic features of COVID-19 difficult.³ In addition, patients with injury at or above thoracic level 6 has a high risk of developing chest infection with autonomic dysreflexia that requires immediate attention.⁶ Patients with SCI are also more likely to develop other comorbidities, such as hypertension, obesity, cardiovascular disease, and diabetes that worsen the prognosis of COVID-19.⁷

In our unit, two patients with SCI and nosocomial COVID-19 presented with severe disease: a 60-year-old male with pneumonia and relevant comorbidity that unfortunately passed away. However, the remaining one have survived to date: a 43-year-old male patient with pathological history with a C4 AIS B cervical injury, without comorbidities that developed acute respiratory failure secondary to pneumonia and presented a favourable progression with appropriate treatments

that included administration of high concentrations of oxygen. In fact, some studies have shown that compared with patients with COVID-19 without SCI, those with SCI presents fewer symptoms, with an average of 1 or 2 symptoms at diagnosis. The main symptoms found in patients with SCI and COVID-19 were fever, asthenia, and dyspnea; some prevalent symptoms such as cough, anosmia, and dysgeusia were absent. The atypical presentation of symptoms may lead to decreased clinical suspicion and delay diagnosis.⁸ Signs of decreased tissue oxygenation such as chest pressure, shortness of breath, increased oxygen demand and inability to be aroused need to be closely monitored.³

Rodríguez-Cola et al published a cohort study of seven institutionalized patients with SCI and COVID-19.⁹ The study population are mainly elderly male tracheostomized patients with cervical SCI. These patients also present with fewer symptoms at the onset of infection, however they had more benign outcomes compared to those without SCI. Some authors stipulate that SCI-induced decreased immune response profile leads to milder clinical presentations and results in poorer prognosis of COVID-19. Understanding the underlying mechanism will help in management of COVID-19 patients.^{10,11}

SCI also impairs individual mobility and ability to perform activities of daily living as they require equipment and complex daily assistance from caregivers. Patients with SCI tends to use wheelchairs and other types of assistive technology equipment for mobilization.¹² Extra precautions are needed with hand washing and cleaning the devices, as SARS-CoV-2 are found to be able to survive on surfaces of these devices. Wearing gloves can assist in protection of the hand, however the gloves need to be constantly sanitized to avoid transmission and external contamination.^{13,14}

Recommendation to limit the spread of SARS-CoV-2 were in place such as social isolation, avoidance of sharing household items, the use of personal protective equipment and improving maintenance of personal hygiene.¹³ Delivery of medical care should favour video consultations

rather than in-person when possible. If situation calls for mandatory in-person meeting, institutions and attending physicians should work in hand to attempt early discharge of patients with SCI to avoid infection of SARS-CoV-2.¹³

Adequate treatment must be guaranteed for patients with SCI. Several disciplines such as anaesthetic management, intra-operative strategies and intra-hospital care have developed specific protocol to limit infection and need to work in harmony in approaching the vast variety of cases including SCI.¹⁵

In pandemic situation, rationing of life-saving therapy and equipment were further highlighted due to the overload of health system. This raises the ethical and legal aspects of treatment of patients with SCI because literatures suggest that health-care professionals tend to make unfounded judgements towards patients with disability.^{16,17}

Health professionals should improve their awareness regarding the adjustments made for the pandemic situation and discuss with the patient and their families regarding their preference should clinical deterioration occur. The clinical decisions on SCI patient should be tailored to each case, and care should not be unilaterally denied.¹³

In summary, the COVID-19 pandemic is especially challenging for patients with SCI because of their clinical and social characteristics. Therefore, owing to the complexities of these patients, the main goals must be to avoid infection among this group and to ensure adequate and dignified treatment on an equal basis with others. A high index of suspicion for COVID-19 in patients with SCI should be considered even when mild symptoms are present.

REFERENCES

1. Palipana D. COVID-19 and spinal cord injuries: The viewpoint from an emergency department resident with quadriplegia. *Emerg Med Australas*. 2020. <https://doi.org/10.1111/1742-6723.13525>
2. Boldrini P, Garcea M, Brichetto G, Reale N, Tonolo S, Falabella V, et al. Living with a disability during the pandemic. "Instant paper from the field" on rehabilitation answers to the COVID-19 emergency.

3. Eur J Phys Rehabil Med. 2020. <https://doi.org/10.23736/S1973-9087.20.06373-X>
3. Korupolu R, Stampas A, Gibbons C, Hernandez Jimenez I, Skelton F, Verduzco-Gutierrez M. COVID-19: Screening and triage challenges in people with disability due to Spinal Cord Injury. Version 2. *Spinal Cord Ser Cases*. 2020;6(1):35. <https://doi.org/10.1038/s41394-020-0284-7>
4. Cardozo CP. Respiratory complications of spinal cord injury. *J Spinal Cord Med*. 2007;30(4):307-8. <https://doi.org/10.1080/10790268.2007.11753945>
5. Biering-Sørensen F, Biering-Sørensen T, Liu N, Malmqvist L, Wecht JM, Krassioukov A. Alterations in cardiac autonomic control in spinal cord injury. *Auton Neurosci*. 2018;209:4-18. <https://doi.org/10.1016/j.autneu.2017.02.004>
6. Prüss H, Tedeschi A, Thiriou A, Lynch L, Loughhead SM, Stutte S, et al. Spinal cord injury-induced immunodeficiency is mediated by a sympathetic-neuroendocrine adrenal reflex. *Nat Neurosci*. 2017;20(11):1549-59. <https://doi.org/10.1038/nn.4643>
7. Lavela SL, Weaver FM, Goldstein B, Chen K, Miskevics S, Rajan S, et al. Diabetes mellitus in individuals with spinal cord injury or disorder. *J Spinal Cord Med*. 2006;29(4):387-95. <https://doi.org/10.1080/10790268.2006.11753887>
8. Dicks MA, Clements ND, Gibbons CR, Verduzco-Gutierrez M, Trbovich M. Atypical presentation of Covid-19 in persons with spinal cord injury. Version 2. *Spinal Cord Ser Cases*. 2020;6(1):38. <https://doi.org/10.1038/s41394-020-0289-2>
9. Rodríguez-Cola M, Jiménez-Velasco I, Gutiérrez-Henares F, López-Dolado E, Gambarrutta-Malfatti C, Vargas-Baquero E, et al. Clinical features of coronavirus disease 2019 (COVID-19) in a cohort of patients with disability due to spinal cord injury. *Spinal Cord Ser Cases*. 2020;6(1):39. <https://doi.org/10.1038/s41394-020-0288-3>
10. Dicks MA, Clements ND, Gibbons CR, Verduzco-Gutierrez M, Trbovich M. Atypical presentation of Covid-19 in persons with spinal cord injury. Version 2. *Spinal Cord Ser Cases*. 2020;6(1):38. <https://doi.org/10.1038/s41394-020-0289-2>
11. López-Dolado E, Gil-Agudo A. Lessons learned from the coronavirus disease 2019 (Covid-19) outbreak in a monographic center for spinal cord injury. *Spinal Cord*. 2020;58(5):517-9. <https://doi.org/10.1038/s41393-020-0473-z>

12. Alexander M. Pandemics, climate change, and disability related to SCI. Version 2. Spinal Cord Ser Cases. 2020;6(1):36. <https://doi.org/10.1038/s41394-020-0285-6>
13. The British Association of Spinal Cord Injury Specialists. Basic guidance on management of spinal cord injury patients during coronavirus (covid-19) pandemic. Available from: https://www.iscos.org.uk/uploads/CV-19/updated%20files%204%2024%2020/ENG_Basic_guidance_on_management.pdf. Published April 3, 2020. [Accessed May 20, 2020]
14. Axelson P. Attention: Wheelchair and assistive technology users precautions for COVID-19. Available from: <http://www.beneficialdesigns.com/wp-content/uploads/2020/05/WC-AT-COVID-19-wash-gdlns-2020-04-29-1533.pdf> [Accessed May 18, 2020]
15. Silva RTE, Cristante AF, Marcon RM, Barros-Filho TEP. Medical care for spinal diseases during the COVID-19 pandemic. Clinics. 2020;75:e1954. <https://doi.org/10.6061/clinics/2020/e1954>
16. Armitage R, Nellums LB. The COVID-19 response must be disability inclusive. Lancet Public Health. 2020;5(5):e257. [https://doi.org/10.1016/S2468-2667\(20\)30076-1](https://doi.org/10.1016/S2468-2667(20)30076-1)
17. Addington-Hall J, Kalra L. Who should measure quality of life? BMJ. 2001;322(7299):1417-20. <https://doi.org/10.1136/bmj.322.7299.1417>



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