CLINICS

EDITORIAL

Management of patients with spinal cord injury during the coronavirus disease pandemic

Ricardo Teixeira e Silva,* **Alexandre Fogaça Cristante**, **Raphael Martus Marcon**, **Tarcísio Eloy Pessoa de Barros-Filho**

Instituto de Ortopedia e Traumatologia (IOT), Hospital das Clinicas HCFMUSP, Faculdade de Medicina, Universidade de Sao Paulo, Sao Paulo, SP, BR.

Silva RT, Cristante AF, Marcon RM, Barros-Filho TEP. Management of patients with spinal cord injury during the coronavirus disease pandemic. Clinics. 2020;75:e2094

*Corresponding author. E-mail: ricardo.teixeira.silva@gmail.com

Coronavirus disease (COVID-19), which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was declared a pandemic in March 2020 and has the potential to overburden health systems, compromise medical staff, and deplete essential hospital supplies. In this scenario, patients with disabilities, especially those with spinal cord injuries (SCIs), are at a high risk of COVID-19 because of their clinical and social characteristics (1).

Individuals with SCI undergo a myriad of physiological changes that increase their risk of morbidity from COVID-19 and may alter and mask the clinical manifestation of the disease (2). These symptoms include impaired cough, reduced lung volumes, and reduced flow rates due to thoracoabdominal and diaphragm muscle weakness (3). Temperature dysregulation (poikilothermia) and dysfunction of the febrile response are frequent because of the interruption of pathways between the hypothalamus and efferent nerves (sympathetic and motor). These findings are more severe in neurological injuries at higher levels (4).

Ventilatory support and tracheostomy in these patients can make assessment of anosmia and dysgeusia difficult. Moreover, patients with injury at or above thoracic level 6 (T6) and chest infections may evolve with autonomic dysreflexia and medical emergencies with symptoms that include elevated blood pressure, low heart rate, chest tightness, facial flushing, profuse sweating, vision changes and pounding headache (2,5).

In addition, systemic immune depression induced by spinal cord injury occurs as a consequence of noradrenergic overactivation and excess glucocorticoid release via stimulation of the hypothalamic-pituitary-adrenal axis (6). Patients with SCI are also more likely to develop other comorbidities that worsen the prognosis of COVID-19, such as hypertension, obesity, cardiovascular disease, and diabetes (7).

In fact, some studies have shown that compared with patients with COVID-19 without SCI, those with SCI had fewer symptoms, with a mean of 1 or 2 symptoms at diagnosis. The main symptoms in patients with SCI and COVID-19 were fever, asthenia, and dyspnea; some prevalent symptoms such as cough, anosmia, and dysgeusia were absent. These differences may decrease the clinical suspicion and delay diagnosis (8-10). Chest pressure, bluish lips, increased oxygen demand, inability to be aroused, and shortness of breath must also be monitored (2).

Rodríguez-Cola et al. published a cohort study of seven institutionalized patients with SCI and COVID-19, mainly including elderly male tracheostomized patients with cervical SCI. These patients presented with fewer symptoms at the onset of infection and had more benign outcomes than those without SCI (9). Some authors questioned whether the SCI-induced decrease in immune response profile actually leads to a milder clinical presentation or would be implicated in the poor prognosis of COVID-19. Nevertheless, they highlighted that this understanding can help in the management of patients with COVID-19 without SCI (9,11).

SCI not only results in physiological changes but also impacts an individual's mobility and ability to perform activities of daily living. Typically, equipment and complex daily assistance from caregivers are needed for the administration of medication, bladder catheterization, and ventilatory support. Therefore, patients with SCI, especially those with cervical or high thoracic injuries, compose one of the groups in society that is most vulnerable to the impacts of COVID-19 (12).

Stillman et al. developed an online survey to assess the international SCI medicine community's experience with the COVID-19 pandemic (13). Only 4.4% of the respondents reported that they had a patient with SCI and COVID-19. The most common symptoms were fever (86.2%), shortness of breath (62.1%), body aches/worsening pain (20.7%), sweats (20.7%), and chest pain (13.8%). Conversely, of the patients with COVID-19 who had SCI, 10.3% had increased spasticity, 6.9% had rigors, and 6.9% remained asymptomatic. However, the number of asymptomatic patients who have not been tested is unknown.

Owing to the pandemic, 47% of the survey respondents reported an increased use of telemedicine, 49% limited specific therapies, and 50.4% promoted home care. Approximately one-third of the health-care professionals reported that patients shared concerns about the pandemic, including increased vulnerability to infection (76.9%), decreased availability of caretakers (42%), inability to obtain necessary supplies (40.2%), inability to be appropriately tested (28.5%), inability to obtain transportation to health-care appointments (21.3%), and inability to self-quarantine (20.7%) (13).

No potential conflict of interest was reported.

Received for publication on June 2, 2020. **Accepted for publication on** June 24, 2020

DOI: 10.6061/clinics/2020/e2094

General considerations for SCI patient care during the COVID-19 pandemic

The global COVID-19 pandemic has already caused an unprecedented impact on populations around the world and plausibly increased the concerns and anxiety of professionals and patients with SCI (14). In addition to general recommendations such as social isolation (if feasible), avoidance of sharing household items, the use of personal protective equipment (PPE), and maintenance of personal hygiene, specific care for these individuals is essential.

Restricting visitors and caregivers and training patients and family members in daily care when possible would be beneficial. Preparing emergency supplies, removing attendants who are suspected as having COVID-19, and developing alternative plans in the absence of these professionals are crucial during this period (14,15).

People who use a manual wheelchair or other types of assistive technology equipment must take extra precautions with respect to hand washing and cleaning their devices because SARS-CoV-2 can survive on surfaces such as the hand rims and tires of wheelchairs. Wearing gloves when pushing the wheelchair is an option to protect and keep the hands clean; however, the gloves should always be sanitized to prevent infection and external contamination (15,16).

Regarding medical care, video appointments must be favored, and elective procedures must be postponed. In cases of mandatory face-to-face evaluation, institutions and physicians experienced in the management of patients with SCI must be prioritized owing to their particular knowledge, and early discharge should be attempted (2,14).

Adequate treatment must be guaranteed for patients with acute spinal cord injury. Different recommendations have already been developed and must be advertised, including specific protocols for spine surgery during the pandemic, anesthetic management, intraoperative strategies and intrahospital care (17).

The rationing of life-saving therapy and equipment is already a reality because of the overload in health systems. This fact raises concerns about the ethical and legal aspects of the treatment of patients with SCI because the literature has already suggested that health-care professionals can make unfounded judgments regarding the quality of life of people with disabilities (18,19).

Health professionals should increase their awareness of this topic and should discuss with patients about their preferences in case of clinical deterioration. Decisions about the escalation of treatment should be based on the likelihood of success, the presence of comorbidities, and overall frailty. The decisions must be made on an individualized basis, and care should not be unilaterally denied (1,14).

Concerning mental health, the use of teleconferences and phone calls to mitigate the effects of physical distancing and isolation should be encouraged. Family members, organizations of persons with disabilities, and health professionals also need to develop alternative support networks and promote public awareness of the consequences of the epidemic on individuals with SCI (20).

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.

AUTHOR CONTRIBUTIONS

All authors participated equally in the realization of this work, both in the search for articles and in the writing and revision of the manuscript.

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. 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
3. 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
4. Sezer N, Akkuş S, Uğurlu FG. Chronic complications of spinal cord injury. World J Orthop. 2015;6(1):24-33. https://doi.org/10.5312/wjo.v6.i1.24
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, Thiriot 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. Righi G, Del Popolo G. COVID-19 tsunami: the first case of a spinal cord injury patient in Italy. Version 2. Spinal Cord Ser Cases. 2020;6(1):22. https://doi.org/10.1038/s41394-020-0274-9
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. Stillman MD, Capron M, Alexander M, Di Giusto ML, Scivoletto G. COVID-19 and spinal cord injury and disease: results of an international survey. Version 2. Spinal Cord Ser Cases. 2020;6(1):21. https://doi.org/10.1038/s41394-020-0275-8
14. The British Association of Spinal Cord Injury Specialists. Bascis 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 3rd, 2020. [Accessed May 20th, 2020]
15. Canadian SCI Community. COVID-19 Guidance for People Living with Spinal Cord Injury. Available from: https://www.iscos.org.uk/uploads/CV-19/ENG_COVID_19_Guidance_for_People%20-%20Copy%201.pdf. Published March 12th, 2020. [Accessed May 20th, 2020]
16. 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 18th, 2020]
17. 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
18. 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
19. 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
20. 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. Eur J Phys Rehabil Med. 2020. https://doi.org/10.23736/S1973-9087.20.06373-X