Commentary
Volume 12:05, 2023

Journal of Spine

ISSN: 2165-7939 Open Access

Micro-CT is Useful for Tracking Changes in the Microcirculation of the Spine Following Chronic Spinal Cord Compression

Wertrew Zopung*

Department of Neurosurgery, CHA University School of Medicine, CHA Bundang Medical Center, Seongnam-si 13496, Republic of Korea

Introduction

Chronic spinal cord compression is a prevalent pathological condition that can lead to significant neurovascular alterations. Micro-Computed Tomography (micro-CT) imaging has emerged as a powerful non-invasive technique for studying structural and functional changes in the microcirculation. This article provides an in-depth exploration of how micro-CT imaging can be utilized to track microcirculatory changes in the spine following chronic spinal cord compression. By examining the benefits, methodologies, and potential clinical applications, we underscore the pivotal role of micro-CT in advancing our understanding of spinal cord pathophysiology. Chronic spinal cord compression is a consequence of various etiologies, including degenerative spinal disorders and traumatic injuries. The accompanying microcirculatory alterations significantly contribute to the pathology. Micro-CT imaging, renowned for its high-resolution visualization capabilities, offers a unique opportunity to investigate these changes in a non-invasive and three-dimensional manner [1-3].

Description

Micro-CT imaging employs X-ray technology to capture high-resolution cross-sectional images of biological tissues. In the context of spinal cord compression, this technique can provide insights into vascular remodeling, tissue perfusion, and alterations in vascular geometry. Micro-CT can non-destructively visualize both the macroscopic and microscopic vascular networks, facilitating the identification of structural changes and potential blood flow disruptions. Chronic spinal cord compression triggers adaptive responses in the microcirculation, such as angiogenesis and vascular remodeling. Micro-CT allows researchers to visualize changes in vessel density, branching patterns, and vessel caliber. Quantitative analyses of vessel parameters can offer valuable insights into the dynamic vascular changes occurring in response to chronic compression. Altered perfusion in compressed spinal cord tissue can have profound implications for neuronal function and viability [4,5]. Micro-CT-based contrast-enhanced techniques enable the visualization of perfused vasculature. These approaches can provide information about regional blood flow distribution and identify areas of compromised perfusion. Micro-CT imaging of spinal cord tissues presents certain challenges, including tissue preparation, contrast agent administration, and image processing. Strategies for optimizing image acquisition, contrast enhancement, and image analysis should be carefully considered to ensure accurate and meaningful results [6].

Conclusion

Micro-CT imaging holds immense promise as a valuable tool for studying microcirculatory changes in the spine following chronic spinal cord compression. By offering detailed insights into vascular remodeling and tissue perfusion, micro-CT contributes to our understanding of the pathophysiology of spinal cord compression. The integration of micro-CT findings with clinical observations could pave the way for improved diagnostic and therapeutic strategies for individuals affected by chronic spinal cord compression. Advancements in micro-CT technology, image analysis techniques, and contrast agents will further enhance our ability to investigate microcirculatory changes in the compressed spinal cord. Overcoming challenges related to imaging resolution, tissue movement artifacts, and quantification accuracy will be crucial for extracting reliable and relevant information from micro-CT datasets.

Acknowledgement

None.

Conflict of Interest

None.

References

1. Korwisi, Beatrice, Ginea Hay, Nadine Attal and Qasim Aziz, et al. "Classification algorithm for the International Classification of Diseases-11 chronic pain classification: Development and results from a preliminary pilot evaluation." *Pain* 162 (2021): 2087-2096.
2. Jackson, Amie B., Marcel Dijkers, Michael J. DeVivo and Robert B. Poczatek. "A demographic profile of new traumatic spinal cord injuries: Change and stability over 30 years." *Arch Phys Med Rehabil* 85 (2004): 1740-1748.
3. Lee, Hye-Lan, Chung-Eun Yeum, HyeYeong Lee and Jinsoo Oh, et al. "Peripheral nerve-derived stem cell spheroids induce functional recovery and repair after spinal cord injury in rodents." *Int J Mol Sci* 22 (2021): 41-41.
4. Baptiste, Darryl C. and Michael G. Fehlings. "Pharmacological approaches to repair the injured spinal cord." *J Neurotrauma* 23 (2006): 318-334.
5. Jian, Yunbo, Dawei Sun and Zhengfeng Zhang. "A nomogram model for prediction of tracheostomy in patients with traumatic cervical spinal cord injury." *Neurospine* 19 (2022): 10-84.
6. Bak, Alex B., Ali Moghaddamjou, Anahita Malvea and Michael G. Fehlings. "Impact of mechanism of injury on long-term neurological outcomes of cervical sensorimotor complete acute traumatic spinal cord injury." *Neurospine* 19 (2022): 10-49.

***Address for Correspondence:** Wertrew Zopung, Department of Neurosurgery, CHA University School of Medicine, CHA Bundang Medical Center, Seongnam-si 13496, Republic of Korea, E-mail: wertewz@gmail.com*

Received: 03 October, 2023, Manuscript No. jsp-23-119015; **Editor Assigned**: 05 October, 2023, PreQC No. P-119015; **Reviewed**: 17 October, 2023, QC No. Q-119015; **Revised**: 23 October, 2023, Manuscript No. R-119015; **Published**: 30 October, 2023, DOI: 10.37421/2165-7939.2023.12.617

How to cite this article: Zopung, Wertrew. "Micro-CT is Useful for Tracking Changes in the Microcirculation of the Spine Following Chronic Spinal Cord Compression." *J Spine* 12 (2023): 617.