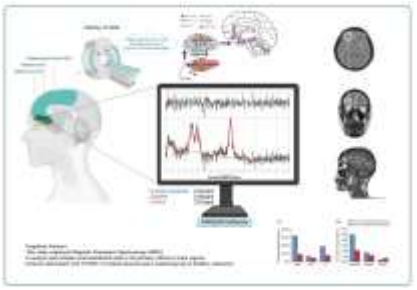
Magnetic Resonance Spectroscopy Findings of Brain Olfactory Areas in Patients with COVID-19 Related Anosmia: a Preliminary Comparative Study

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Abstract

Statement The COVID-19 pandemic has brought to light an intriguing and puzzling symptom - anosmia, or loss of the sense of smell. This study delves into the complex pathogenesis of this condition, focusing on the role of magnetic resonance spectroscopy (MRS) in assessing molecular neurometabolite changes within key brain olfactory regions in patients with COVID-19-related anosmia. Seven individuals with persistent COVID-19-related anosmia and seven healthy volunteers underwent MRS scans, with a specific focus on the anterior cingulate cortex (ACC), dorsolateral prefrontal cortex (DLPFC), orbitofrontal cortex (OFC), insular cortex (IC), and ventromedial prefrontal cortex (VMPFC). Neurometabolites such as N-acetyl-aspartate (NAA), choline (Cho), creatine (Cr), and their ratios were measured and analyzed using TARQUIN software. The findings revealed a significant association between MRS results within the OFC and COVID-19-related anosmia ($p < 0.01$), with NAA emerging as one of the most crucial neurometabolites (p interaction = 0.006). Notably, reduced levels of NAA ($p < 0.001$), Cr ($p < 0.001$), and NAA/Cho ratio ($p = 0.007$) within the OFC were characteristic of COVID-19-related anosmia. These results suggest that central nervous system impairment might be linked to persistent COVID-19-related anosmia. This study highlights the potential of MRS as a valuable tool for unraveling the mysteries of COVID-19-related anosmia and hints at the prospect of more targeted pharmacologic or non-pharmacologic treatments based on MRS findings. Overall, these findings contribute to our understanding of the underlying pathophysiology of anosmia in the context of COVID-19.

Image



Recent Publications

1. Haghani Dogahe M, Ramezani S, Reihanian Z, Raminfard S, Feizkhah A, Alijani B, et al. Role of brain metabolites during acute phase of mild traumatic brain injury in prognosis of post-concussion syndrome: A 1H-MRS study. Psychiatry research Neuroimaging. 2023;335:111709.
2. Haghani Dogahe M, Feizkhah A, Seddighi S, Kiani P, Shafaei F. Application of Magnetic Resonance Spectroscopy in Neurocognitive Assessment After Head Injury: A Systematic Review. Caspian Journal of Neurological Sciences. 2021;7(2):118-31.
3. Alijani B, Namin AK, Emamhadi M, Chabok SY, Behzadnia H, Haghani Dogahe M. Endoscopic Endonasal Approach to the Craniovertebral Junction Lesions: A Case Series of 18 Patients. Journal of neurological surgery Part B, Skull base. 2023;84(5):499-506.
4. Emamhadi M, Haghani Dogahe M, Emamhadi A. Iatrogenic Cervical Nerve Root Injury After Spine Surgery: How Nerve Surgeons Can Assist Spine Surgeons. International journal of spine surgery. 2022;16(6):1041-5.
5. Emamhadi M, Haghani Dogahe M, Gohritz A. Nerve transfers in tetraplegia: a review and practical guide. Journal of neurosurgical sciences. 2021;65(4):431-41.
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Photograph



Biography

Dr. Mohammad Haghani Dogahe, a medical doctor and general practitioner who graduated from Guilan University of Medical Sciences in Guilan, Iran, is dedicated to advancing the use of cutting-edge diagnostic and therapeutic methods in the realms of Brain, Spine, and peripheral nerve Surgery. His primary areas of expertise encompass Brain Mapping, Neural Networks, Brain-Computer Interfaces, Magnetic Resonance Spectroscopy, Radiosurgery, Skull Base Surgery, Functional Neurosurgery, and Reconstructive Surgery. Currently, he actively focuses on the utilization of Magnetic Resonance Spectroscopy within the fields of neurosurgery and neurology. Additionally, he is at the forefront of exploring the future applications of Neural Computer Interfaces.

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