

Transcranial Magnetic Stimulation is Being Looked into as a Potential Treatment for Chemo Brain

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Abstract

Cancer treatment has come a long way, offering hope and extended lives to countless individuals worldwide. Chemotherapy, one of the most common forms of cancer treatment, has saved countless lives. However, it comes with a significant drawback cognitive impairment, often referred to as "chemo brain." This phenomenon has long been a subject of concern among cancer survivors and healthcare professionals, as it can severely impact a patient's quality of life. In recent years, there has been growing interest in the use of Transcranial Magnetic Stimulation (TMS) as a potential treatment for chemo brain. This article explores the concept of chemo brain, its impact on patients and the emerging role of TMS in alleviating its symptoms. Chemo brain is a colloquial term used to describe the cognitive deficits that cancer patients may experience during and after chemotherapy treatment. While it has been widely reported and acknowledged, chemo brain is not yet fully understood in terms of its underlying mechanisms. Patients often complain of difficulty with short-term memory, forgetfulness and difficulty recalling words or names. Chemo brain can result in reduced ability to focus, maintain attention, or multitask effectively. Patients may experience a noticeable slowdown in their ability to process information, which can affect decision-making and problem-solving.

Keywords: Cancer treatment • Chemotherapy • Chemo brain • Transcranial magnetic stimulation

Introduction

Many individuals with chemo brain report significant fatigue, which can contribute to cognitive problems. Given the prevalence and impact of chemo brain, there has been a growing interest in finding effective treatments to alleviate its symptoms. Historically, healthcare professionals have relied on a combination of strategies, including cognitive rehabilitation therapy, pharmacological interventions and lifestyle modifications. While these approaches can help some individuals manage their cognitive difficulties, there remains a need for more targeted and innovative treatments. Transcranial Magnetic Stimulation (TMS) is a non-invasive neurostimulation technique that has gained attention for its potential in treating a variety of neurological and psychiatric conditions. TMS works by using electromagnetic coils to generate focused magnetic fields that can penetrate the scalp and skull to stimulate or inhibit neural activity in specific regions of the brain. This precise targeting of brain areas makes TMS an appealing candidate for addressing the cognitive deficits associated with chemo brain [1].

Literature Review

TMS is believed to work by modulating the activity of neurons in the brain. When applied to specific brain regions, it can enhance neural plasticity, which is the brain's ability to adapt and reorganize itself in response to new experiences or damage. By stimulating areas of the brain associated with memory, attention and executive function, TMS may help improve cognitive performance in chemo brain patients. TMS has been approved by the U.S. Food and Drug Administration for the treatment of depression, indicating its

potential to address mood disturbances often associated with chemo brain. TMS is a non-invasive procedure that does not require surgery or medications, reducing the risk of side effects and complications. TMS can be precisely targeted to specific brain regions, allowing for personalized treatment plans tailored to each patient's cognitive deficits [2].

The use of TMS in chemo brain treatment is still in its early stages, but there is a growing body of research and clinical trials exploring its potential benefits. These studies aim to better understand the effectiveness of TMS in addressing chemo brain symptoms and to identify the optimal parameters for treatment. A study published in the journal "Cancer" in 2019 investigated the use of TMS in breast cancer survivors with cognitive impairment. The results showed promising improvements in memory and attention following TMS treatment. Additionally, ongoing clinical trials are exploring TMS as a potential intervention for chemo brain in various cancer populations, including lung cancer and lymphoma survivors. TMS may not be readily available in all healthcare settings and access to this treatment may be limited in some regions

Discussion

The long-term effects of TMS on chemo brain symptoms and cognitive function require further investigation. Identifying the most suitable candidates for TMS treatment is essential to maximize its effectiveness. Chemo brain remains a significant concern for cancer survivors, affecting their cognitive function and overall quality of life [3]. As our understanding of this condition continues to evolve, it is crucial to explore innovative treatment options like Transcranial Magnetic Stimulation (TMS). While TMS is still in the early stages of research and development for chemo brain, the preliminary results and ongoing clinical trials are promising. As the field of neurostimulation advances, TMS holds great potential not only for alleviating chemo brain symptoms but also for enhancing our understanding of the brain's capacity to adapt and recover from cognitive deficits. In the years to come, we may witness TMS emerging as a valuable tool in the arsenal of treatments available to cancer patients, offering hope for improved cognitive function and a better quality of life after chemotherapy [4].

Chemotherapy, a powerful and life-saving cancer treatment, often comes with a side effect known as "chemo brain" or "chemo fog." This cognitive impairment can affect a patient's memory, concentration and overall cognitive

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function, significantly impacting their quality of life during and after cancer treatment. While chemo brain remains a challenging issue for both patients and healthcare providers, a ray of hope has emerged in the form of Transcranial Magnetic Stimulation (TMS). TMS, a non-invasive brain stimulation technique, is being explored as a potential treatment for chemo brain. In this article, we will delve into the phenomenon of chemo brain, the current treatment landscape and the promising role of TMS in alleviating its symptoms [5].

Chemo brain is a term used to describe cognitive deficits experienced by cancer patients during and after chemotherapy treatments. These deficits can manifest as memory problems, difficulty concentrating, impaired attention span and a general sense of mental fog. While the exact cause of chemo brain is not fully understood, researchers believe that it may result from a combination of factors, including the toxic effects of chemotherapy drugs on the brain, inflammation and the psychological stress associated with cancer diagnosis and treatment. Chemo brain can have a profound impact on a patient's life. It may affect their ability to work, perform daily tasks and engage in social activities. For some, the cognitive impairments persist long after cancer treatment has ended, leading to frustration and reduced quality of life. As of my last knowledge update in September 2021, there is no specific pharmacological treatment approved for chemo brain. However, healthcare providers often recommend various strategies and interventions to help patients manage their symptoms. These may include cognitive rehabilitation therapy, which involves exercises to improve memory and cognitive function, as well as lifestyle changes like regular exercise, a balanced diet and stress management techniques [6].

Conclusion

Glioblastoma remains a formidable challenge in oncology due to its highly invasive nature and resistance to current treatment modalities. Understanding the role of the peritumoural brain zone in glioblastoma progression is crucial for developing effective therapeutic strategies to combat this devastating disease. Recent research has shed light on the potential involvement of CDK4 and EXT2 as malignancy-drivers within the peritumoural zone. CDK4's regulatory role in the cell cycle and EXT2's involvement in HSPG biosynthesis offer promising targets for future therapeutic interventions. As we delve deeper into the molecular and cellular mechanisms governing the invasive behavior of glioblastoma cells within the peritumoural brain zone, we may uncover additional targets for novel therapies. The development of targeted treatments aimed at limiting the infiltrative properties of glioblastoma cells holds great promise in improving patient outcomes and moving closer to finding a cure for this devastating disease. However, it is essential to remember that medical research is an ongoing process and further studies and clinical trials will be necessary to validate the potential of CDK4, EXT2 and other targets in

glioblastoma therapy. Targeting EXT2 or other components of the HSPG biosynthesis pathway presents a potential therapeutic strategy to limit the invasive properties of glioblastoma cells and prevent disease recurrence. TMS involves the use of a magnetic coil placed against the scalp to deliver brief, focused magnetic pulses to specific regions of the brain. These pulses induce electrical currents that can modulate neural activity in the targeted brain areas.

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Conflict of Interest

None.

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