THE RELEVANCE OF STROKE AND LIVER FUNCTION.

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Abstract: Cerebral stroke (ONMK) is a leading cause of morbidity and mortality worldwide, with far-reaching systemic consequences. Among the less explored but critical areas is the relationship between stroke and liver function. This article investigates the complex interplay between stroke-induced brain damage and hepatic function, emphasizing the pathophysiological mechanisms that link cerebral ischemia to liver dysfunction. The discussion includes insights into the metabolic, inflammatory, and oxidative stress responses that affect both organs, highlighting the importance of integrated care in stroke management.
Keywords: Stroke, ONMK, liver function, cerebral ischemia, hepatic dysfunction, oxidative stress, systemic inflammation.

INTRODUCTION

Stroke, or acute cerebrovascular accident (ONMK), is a significant public health issue, recognized as one of the leading causes of death and disability worldwide. While the neurological impacts of stroke are well-documented, its systemic effects, particularly on liver function, are less understood. The liver, a key organ in metabolic regulation, detoxification, and immune response, can be significantly impacted by the systemic consequences of stroke. This article seeks to explore the pathophysiological connections between stroke and liver function, providing insights into the clinical implications of these interactions.

Methods

1. Literature Review: A comprehensive review of existing studies on the relationship between stroke and liver function was conducted. Databases such as PubMed, Scopus, and Google Scholar were utilized to gather relevant articles from the past two decades.
2. Clinical Observations: Analysis of clinical cases and observational studies that reported liver function anomalies in stroke patients.
3. Biochemical Analysis: Examination of biochemical markers of liver function, including liver enzymes (ALT, AST), bilirubin levels, and markers of hepatic inflammation in stroke patients.

In the past, stroke research has focused mainly on intracerebral events following focal ischemia, where oxygen and glucose deprivation triggers excitotoxicity, inflammation, oxidative stress, blood–brain barrier (BBB) disruption and eventually cell death. Despite decades of intense research, therapeutic options for acute ischemic stroke (AIS) are still limited to recanalization approaches with only a minority of stroke patients being eligible for the administration of tissue-type plasminogen activator (tPA), a thrombolytic drug, even when combined with endovascular thrombectomy. Recently, the consequences of AIS for other organs than the central nervous system have received increasing attention and it is now widely accepted that stroke induces multiple alterations in the periphery.

Results

1. Metabolic Dysfunction Post-Stroke: Stroke-induced cerebral ischemia triggers a cascade of metabolic changes that can extend beyond the brain. The liver, being central to metabolic homeostasis, often shows signs of dysfunction. Elevated levels of liver enzymes (ALT, AST) have been reported in patients post-stroke, indicating hepatic stress or damage. This can be attributed to systemic inflammation and oxidative stress that arise as a result of ischemic brain injury.
2. Inflammatory Response and Liver Stress: The inflammatory response following a stroke plays a pivotal role in liver dysfunction. The release of pro-inflammatory cytokines such as TNF-α, IL-6, and IL-1β from the brain and immune cells can cause hepatic inflammation. This response may exacerbate pre-existing liver conditions or trigger acute hepatic injury, particularly in patients with predisposing factors such as metabolic syndrome or alcohol use.
3. Oxidative Stress and Hepatic Impact: Oxidative stress is a major consequence of stroke, contributing to both neuronal and hepatic injury. Reactive oxygen species (ROS) generated during ischemic events can overwhelm the liver's antioxidant defenses, leading to lipid peroxidation, mitochondrial dysfunction, and subsequent liver cell apoptosis. The liver's role in detoxifying these harmful byproducts makes it particularly vulnerable during systemic oxidative stress.
4. Hepatic Encephalopathy and Stroke Interactions: In severe cases, the interplay between liver dysfunction and stroke can lead to complications such as hepatic encephalopathy, where liver failure exacerbates neurological symptoms. This bi-directional relationship highlights the need for a holistic approach to managing stroke patients, considering potential hepatic complications.
5. Clinical Implications: Understanding the liver-brain axis is crucial for improving patient outcomes post-stroke. Monitoring liver function in stroke patients can

provide early indicators of systemic complications, allowing for timely interventions. Moreover, therapeutic strategies aimed at reducing systemic inflammation and oxidative stress may protect both brain and liver function, enhancing recovery prospects.

With the accelerated aging of the population, ischemic stroke has become a heavy disease burden worldwide. Acute brain ischemia leads to a series of alterations in the immune system, the hypothalamic–pituitary–adrenal axis, and the autonomic nervous system, which negatively affect peripheral organs and contribute to ischemic brain injury development. Emerging research highlights a bidirectional communication between the brain and liver, as evidenced by changes in hepatic glucose metabolism, bilirubin, and liver enzyme levels in the early stages of an ischemic stroke, which subsequently influence stroke prognosis

Discussion

The connection between stroke and liver function is complex, involving multiple pathophysiological mechanisms that can worsen outcomes in stroke patients. The liver's response to systemic inflammation and oxidative stress following a stroke highlights the importance of integrated care approaches. This understanding urges clinicians to monitor hepatic function closely in stroke patients, especially those with underlying liver conditions or metabolic disorders. Furthermore, research into protective strategies, such as the use of antioxidants or anti-inflammatory agents, could mitigate the hepatic impact of stroke, improving overall patient prognosis.

Conclusion

The relevance of stroke to liver function extends beyond the brain, affecting systemic health and recovery. The interplay between cerebral ischemia and hepatic function underscores the need for comprehensive stroke management strategies that address not only neurological deficits but also potential systemic complications. By recognizing and addressing the impact of stroke on the liver, healthcare providers can better support patient recovery and reduce the risk of long-term complications.

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