

Medicine

An Update of Ischemic Hepatitis

A Review

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Ischemic hepatitis, also referred to as shock liver, is a condition that is marked by liver damage that is the consequence of an insufficient blood supply to the liver. This article offers a thorough examination of ischemic hepatitis, encompassing its pathophysiology, clinical presentation, diagnosis, treatment, and prognosis. Understanding the causes, risk factors, and management strategies of ischemic hepatitis is crucial for improving the outcomes of affected individuals. Our objective is to illuminate this condition and improve the understanding of healthcare professionals and patients by investigating the most recent research and future developments in this field.

Keywords: Ischemic Hepatitis; Diagnosis; Prognosis; Therapeutics; Outcomes

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Introduction

ISCHEMIC HEPATITIS, also known as shock liver or hypoxic hepatitis, is a condition characterized by liver injury and dysfunction due to reduced blood flow or oxygen delivery to the liver (1). This can be caused by a variety of factors, including severe dehydration, cardiac failure, shock, or low blood pressure. Ischemic hepatitis is a condition that is relatively uncommon; however, it can have severe repercussions if not promptly addressed.

A sudden decrease in blood pressure is one of the primary causes of ischemic hepatitis, as it can reduce the passage of blood to the liver and deprive it of oxygen (2). This can occur in instances of severe hypotension, shock, or depletion, in which the body's organs are not receiving an adequate amount of oxy-

genated blood. Liver injury occurs when liver cells are damaged or malfunction in the absence of an adequate supply of oxygen.

Jaundice, abdominal pain, nausea, vomiting, fatigue, and dark urine are potential symptoms of ischemic hepatitis. The severity of these symptoms depends on the extent of the liver injury and the underlying cause of reduced liver blood flow. The diagnosis of ischemic hepatitis typically entails a physical examination, blood tests to evaluate liver function, and imaging studies, such as CT scans or ultrasounds, to assess the liver's blood flow.

The primary objective of ischemic hepatitis treatment is to resolve the underlying cause of reduced blood flow to the liver and to support liver function (3). This may entail the administration of intravenous fluids to enhance blood pressure and oxygen

delivery, the provision of oxygen therapy, and the treatment of any underlying conditions, such as heart failure or shock. In some cases, patients may need to be hospitalized and monitored closely to prevent further liver injury.

Therefore, ischemic hepatitis is a severe condition that can lead to liver injury and dysfunction as a consequence of decreased blood flow or oxygen delivery to the liver. In order to prevent long-term complications and guarantee a complete recovery, it is essential to administer prompt diagnosis and treatment. Healthcare providers can assist patients with ischemic hepatitis in regaining their health and well-being by addressing the underlying cause of reduced blood flow and supporting liver function.

Causes and Risk Factors

Hypoperfusion, which is characterized by a reduction in blood flow to the liver, is one of the primary causes of ischemic hepatitis (3). Heart failure, severe dehydration, or shock may induce this outcome. Impaired blood flow exposes liver cells to cellular injury and dysfunction due to inadequate oxygen and nutrient supply. Severe dehydration, blood loss, severe infections, or cardiac failure can also trigger shock. Shock significantly reduces blood flow to the liver, leading to a shortage of oxygen and nutrients for the liver cells, which results in ischemic hepatitis and liver cell damage.

Hypotension, or reduced blood pressure, is another common risk factor for ischemic hepatitis (4). Substantial drops in blood pressure can significantly compromise blood flow to the liver, leading to ischemia and liver cell damage. Individuals are at an elevated risk of developing ischemic hepatitis because of the low blood pressure associated with conditions such as hemorrhagic shock or septic shock.

Surgery, particularly those that involve the heart or main blood vessels, is another cause of ischemic hepatitis. Surgery can cause ischemic hepatitis by temporarily interrupting or reducing blood flow to the liver (5). Furthermore, the surgical procedure and the potential for complications may increase the risk of ischemic hepatitis in individuals who have undergone liver transplant surgery.

Severe infections like sepsis can also cause ischemic hepatitis by causing systemic inflammation and reducing blood flow to the liver (6). In addition, individuals who have pre-existing liver conditions, such as cirrhosis or fatty liver disease, may be at a heightened risk of developing ischemic hepatitis as a result of impaired liver function and blood flow.

Other various risk factors can increase the likelihood of developing ischemic hepatitis. These risk factors include advanced age, as older individuals may be more susceptible to shock and other conditions that can contribute to ischemic hepatitis and may have reduced blood flow to the liver. Furthermore, individuals who have pre-existing medical conditions, such as diabetes, heart disease, or renal disease, may be at a higher risk of developing ischemic hepatitis as a result of the effects of these conditions on blood flow and liver function (7).

Certain medications, such as vasoconstrictors or anti-hypertensive pharmaceuticals, can affect blood flow to the liver and increase the risk of developing ischemic hepatitis, which are additional risk factors for ischemic hepatitis (8). Indi-

viduals who abuse alcohol or narcotics may also be at a heightened risk of developing ischemic hepatitis, as these substances can affect blood flow and liver function.

Clinical Presentation and Symptoms

Jaundice, a condition characterized by discoloration of the skin and eyes, is one of the most common symptoms of ischemic hepatitis. Jaundice is a consequence of impaired liver function, which leads to the accumulation of bilirubin in the bloodstream (9). Patients with ischemic hepatitis may also experience abdominal pain, which can range from moderate discomfort to severe cramping. People often experience this discomfort in the right upper quadrant of the abdomen, where the liver is frequently located.

An additional indicator of ischemic hepatitis is elevated liver enzymes, including aspartate aminotransferase (AST) and alanine aminotransferase (ALT) (10). Damage to liver cells releases these enzymes into the circulation, leading to elevated levels in the blood. People frequently use elevated liver enzymes as a critical indicator of liver injury to diagnose and track the progression of ischemic hepatitis.

Patients with ischemic hepatitis may also report fatigue, nausea, and vomiting, in addition to jaundice, abdominal pain, and elevated liver enzymes (11). The diagnosis of ischemic hepatitis is difficult due to the non-specific nature of these symptoms, which can be attributed to a variety of other conditions. Other symptoms of ischemic hepatitis may include pallid stools, itching, and dark urine, all of which are indicative of liver dysfunction.

Complications such as acute liver failure, which can be life-threatening, may develop in patients with severe ischemic hepatitis (11). Hepatic encephalopathy, coagulopathy, and multi-organ failure are the results of acute liver failure, which is defined by the rapid deterioration of liver function (12). Patients with acute liver failure may require liver transplantation to survive, underscoring the importance of early detection and management of ischemic hepatitis.

Diagnosis and Differential Diagnosis

The diagnosis of ischemic hepatitis involves a combination of clinical symptoms, laboratory tests, and imaging investigations. Abdominal pain, jaundice, and elevated liver enzymes are common symptoms of ischemic hepatitis. Laboratory tests may detect elevated levels of liver enzymes such as AST, ALT, bilirubin, and alkaline phosphatase. Imaging studies, such as CT scans or ultrasounds, may demonstrate indicators of liver injury, including hepatomegaly or diminished blood flow to the liver (3).

The differential diagnosis of ischemic hepatitis includes drug-induced liver injury, viral hepatitis, autoimmune hepatitis, and alcoholic hepatitis. It can be difficult to differentiate ischemic hepatitis from these other causes, as they may exhibit similar symptoms and laboratory findings. However, a thorough history and physical examination, along with the presence of risk factors for ischemic hepatitis like hypotension or shock, can further narrow the differential diagnosis.

A critical component of the differential diagnosis of ischemic hepatitis is the exclusion of acute liver failure, a

life-threatening condition that can be caused by a variety of factors, including ischemic hepatitis. Acute liver failure is defined by a sudden deterioration of liver function, which results in coagulopathy, encephalopathy, and multiorgan failure. To prevent complications and improve outcomes, acute liver failure must be identified and treated promptly.

Therapeutic Strategies

The first step in treating ischemic hepatitis is to identify the underlying cause of the reduced liver blood flow (13). This may include the management of cardiac failure, the treatment of low blood pressure, or the patient's rehydration. Under certain circumstances, we may implement medications to enhance blood circulation or facilitate cardiac function. It is imperative to identify and rectify the underlying issue to prevent further liver injury.

After resolving the fundamental cause of ischemic hepatitis, the focus shifts to preventing further damage and maintaining liver function. This may entail the provision of supportive care, including the surveillance of liver function tests, intravenous fluids, and oxygen therapy. In severe cases, the patient may need hospitalization for advanced treatment options and close monitoring.

In certain instances, medications may be implemented to alleviate the symptoms of ischemic hepatitis and promote liver function (14). These medications may be used to enhance liver function, control nausea and vomiting, or reduce inflammation. It is imperative to collaborate with a healthcare provider to ascertain the optimal treatment plan for the individual, taking into account their unique medical history and requirements.

A liver transplant may be required in cases of severe ischemic hepatitis, which results in substantial liver injury (15). A liver transplant means the surgical removal of the diseased liver and its replacement with a healthy liver from a donor. This procedure is reserved for situations in which the liver injury is extensive and other treatment options have been unsuccessful.

It is also critical for individuals with ischemic hepatitis to maintain a healthy lifestyle to prevent additional injury and support liver function (16). This may include the following: adhering to a nutritious diet, refraining from alcohol and substances that can damage the liver, and engaging in physical activity. Together with a healthcare provider, develop a comprehensive plan for managing ischemic hepatitis and promoting liver health.

It is essential that patients with ischemic hepatitis undergo routine liver function tests to evaluate the efficacy of their treatment and the progression of their condition. This may entail the administration of blood tests to assess liver enzymes, bilirubin levels, and other indicators of liver function. These evaluations assist healthcare providers in determining whether the treatment is effective and whether any modifications are necessary.

Liver failure or portal hypertension may develop as complications of ischemic hepatitis in certain instances. These complications may necessitate additional treatment options, such as procedures to alleviate hepatic pressure or medications to reduce fluid accumulation in the abdomen. It is imperative to collaborate with a healthcare provider to resolve any potential compli-

cations.

To prevent additional liver injury, it is imperative that individuals with ischemic hepatitis obtain prompt medical attention and adhere to the prescribed treatment regimen. Failure to address the underlying causes of reduced blood flow or to delay treatment can result in more severe liver injury and complications. Collaborating with a healthcare provider to tailor a customized treatment plan to the individual's unique medical history and requirements is critical.

Prognosis and Complications

The prognosis of ischemic hepatitis is contingent upon the severity of the liver injury, the underlying cause of the condition, and the timely initiation of treatment. Often, prompt management can reverse ischemic hepatitis by restoring liver blood flow and resolving any underlying conditions. Nevertheless, ischemic hepatitis can progress to liver failure, which can be life-threatening if left untreated or if the liver injury is severe.

The development of acute liver failure is one potential complication of ischemic hepatitis. This occurs when the liver is unable to perform its essential functions, including the production of essential proteins and the filtering of toxins from the circulation. If not promptly addressed, acute liver failure can result in a variety of symptoms, such as jaundice, confusion, and bleeding disorders, and can ultimately lead to multiple organ failure and mortality.

Chronic liver disease develops as an additional complication of ischemic hepatitis. If a liver injury is extensive and persists over an extended period, chronic liver disease may develop. This can lead to the development of conditions like cirrhosis, liver cancer, and portal hypertension, which can have a significant impact on quality of life and increase the risk of complications and mortality, such as liver failure.

In some cases, ischemic hepatitis can also lead to the development of sepsis, a life-threatening condition that occurs when the body's immune response to an infection causes extensive inflammation. Sepsis can further damage the liver and other organs, leading to a decline in overall health and an elevated risk of complications, such as organ failure and mortality.

Furthermore, ischemic hepatitis may result in hepatic encephalopathy, a severe brain disorder that arises when the liver is incapable of effectively eliminating contaminants from the bloodstream. Hepatic encephalopathy can significantly impact cognitive function and overall quality of life, causing symptoms such as confusion, forgetfulness, and coma. To mitigate additional complications and enhance outcomes, this condition necessitates immediate intervention.

Patients with ischemic hepatitis are at an elevated risk of developing complications, including coagulopathy, metabolic disturbances, and electrolyte imbalances. Prompt diagnosis and treatment are essential for enhancing outcomes and preventing additional complications, as these complications can exacerbate liver injury and enhance the overall severity of the condition.

Despite the potential complications of the condition, patients with ischemic hepatitis generally have a favorable prognosis if they receive prompt and appropriate management. This may involve interventions to address the underlying cause of the ischemia and prevent further liver injury, as well as supportive

care to stabilize the patient's condition. In certain instances, patients may necessitate liver transplant surgery to replace the damaged liver tissue and enhance their overall liver function.

Prevention Strategies

It is pivotal to prioritize the preservation of cardiovascular health to prevent ischemic hepatitis. This encompasses the management of conditions such as hypertension, diabetes, and high cholesterol, which can exacerbate the risk of vascular disease and impede the passage of blood to the liver. To preserve cardiac health, it is crucial to adhere to a nutritious diet, engage in regular physical activity, and refrain from smoking and excessive alcohol consumption.

Secondly, closely monitor and manage any conditions that may result in shock or hypotension, such as severe infections, hemorrhage, or heart failure. Prompt treatment of these underlying conditions can prevent the development of ischemic hepatitis by ensuring the liver receives an adequate blood supply.

In addition, preserving proper electrolyte balance and hydration to prevent dehydration can help to avoid hypotension and diminish blood flow to the liver. This is particularly critical during periods of illness or strenuous physical activity, when fluid losses may be substantial.

Further, exercise caution when administering medications that may impact liver function or blood pressure, as they may elevate the potential for ischemic hepatitis. It is crucial to consult with a healthcare provider prior to initiating or discontinuing any medication, particularly if you have underlying cardiovascular conditions or liver disease.

Healthcare providers should also closely monitor individuals who are at risk of developing ischemic hepatitis, such as those with a history of liver dysfunction or cardiovascular disease. Regular check-ups and screening tests can facilitate the detection of early indicators of liver damage and the subsequent prompt intervention to prevent the progression of ischemic hepatitis.

Moreover, closely monitor individuals who have undergone significant surgeries or trauma for signs of hypotension or shock, as these conditions can increase the risk of ischemic hepatitis. It is critical to meticulously follow the postoperative care instructions and to promptly notify a healthcare provider of any liver dysfunction symptoms. Also, closely monitor individuals with a history of severe infections or sepsis for signs of hypotension and shock, as these conditions can increase the risk of ischemic hepatitis. It is crucial to promptly seek medical attention if you experience symptoms such as abdominal pain, jaundice, or confusion, as they may suggest liver injury.

Meanwhile, to mitigate the likelihood of developing ischemic hepatitis, sustain a healthy lifestyle that encompasses stress management, regular exercise, and a balanced diet. These lifestyle factors have the potential to enhance the overall health of the vascular system and decrease the likelihood of conditions that can result in an insufficient blood supply to the liver.

Research and Future Directions

The primary objective of research on ischemic hepatitis has been to comprehend the mechanisms that underlie liver injury in the context of ischemia. Research has demonstrated that the liver's

response to ischemia involves the accumulation of toxic by-products, decreased oxygen absorption, and cellular swelling (17). Cell death, inflammation, and organ failure may result from these modifications. By elucidating these molecular pathways, researchers aim to identify potential targets for therapeutic intervention.

One area of ongoing research is developing animal models to investigate ischemic hepatitis (18, 19). These models enable researchers to simulate ischemia conditions in a controlled environment and examine their impact on liver function. Researchers can improve their understanding of the disease's pathogenesis and evaluate potential treatments by adjusting variables such as ischemia duration and severity.

An additional area of research is the identification of biomarkers for the early detection and monitoring of ischemic hepatitis (20). Currently, the diagnosis is based on a combination of clinical symptoms, liver function tests, and imaging studies. Nevertheless, these techniques may not be sufficiently sensitive or specific to identify subtle alterations in liver function. Researchers aim to improve early detection and monitoring of ischemic hepatitis by identifying biomarkers, such as specific enzymes or proteins in the blood.

Genetic research has offered valuable insights into the risk factors associated with ischemic hepatitis (2). Genetic variations in critical enzymes or pathways may render certain individuals more susceptible to liver injury in the presence of diminished blood flow. Researchers aim to customize treatments and interventions more effectively for at-risk individuals by identifying these genetic factors.

Future research in ischemic hepatitis should investigate innovative therapies that safeguard the liver from ischemic injury. In certain studies, pharmacological agents that target specific cellular pathways involved in cellular injury and inflammation have demonstrated promising results (21). Other potential remedies for ischemic hepatitis, such as stem cell therapy or liver support devices, are also under investigation.

Clinical trials are essential for assessing the safety and efficacy of novel treatments for ischemic hepatitis. These trials are essential for translating fundamental research discoveries into clinical practice and enhancing patient outcomes in this condition. Researchers can optimize treatment strategies for ischemic hepatitis by evaluating novel therapies in controlled clinical settings to ascertain their benefits and risks.

Furthermore, the long-term repercussions of liver injury in survivors are also the focus of research on ischemic hepatitis. Patients who recover from ischemic hepatitis may continue to experience liver dysfunction, an elevated risk of liver disease, or other complications. It is crucial to comprehend these long-term consequences to ensure that patients with a history of ischemic hepatitis receive the necessary follow-up care and monitoring.

Enhancing ischemic hepatitis prevention strategies should also be the focus of research endeavors. Clinicians can mitigate the risk of liver injury during episodes of circulatory shock by proactively identifying patients at high risk for developing ischemic hepatitis, such as those with underlying liver disease or cardiovascular conditions. This includes fluid resuscitation optimization, hemodynamic stability maintenance, and meticulous liver function monitoring in high-risk patients.

Conclusion

An insufficient blood supply to the liver causes acute liver injury in ischemic hepatitis, a rare but severe condition. This may transpire in a variety of clinical contexts, including cardiac failure, septic shock, surgery, or trauma. Abdominal pain, jaundice, and coagulopathy frequently accompany ischemic hepatitis, which is characterized by significantly elevated serum transaminases. A high index of suspicion and the meticulous exclusion

of other potential causes of liver impairment are necessary for the diagnosis of ischemic hepatitis. To prevent further organ injury, management must identify the root cause of decreased hepatic perfusion and provide supportive care. Patients with severe ischemic hepatitis typically have a poor prognosis, as evidenced by the literature's high mortality rates. Additional research is required to enhance the understanding of the pathophysiology of this condition and to enhance the outcomes for those who are affected. ■

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