Scientific Research Publishing

Open Journal of Gastroenterology, 2024, 14, 226-232
https://www.scirp.org/journal/ojgas
ISSN Online: 2163-9469
ISSN Print: 2163-9450

Dunbar Syndrome and Hypoxic Hepatitis: An Unusual Presentation

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How to cite this paper: Cherkaoui, H., Chaouech, I., El Abidi, Y., Robleh, H., Lamine, A., Lahlali, M., Lahmidani, N., Mekkaoui, A., Elyousfi, M., Benajah, D.A., Ibrahimi, A., El Abkari, M., Bouardi, N., Maaroufi, M. and Abid, H. (2024) Dunbar Syndrome and Hypoxic Hepatitis: An Unusual Presentation. *Open Journal of Gastroenterology*, **14**, 226-232.
https://doi.org/10.4236/ojgas.2024.146025

Received: May 20, 2024
Accepted: June 22, 2024
Published: June 25, 2024

Abstract

Hypoxic hepatitis, also known as ischemic hepatitis, is characterized by acute hepatocellular injury due to inadequate oxygen delivery to the liver. Celiac trunk stenosis can lead to hepatic ischemia and subsequent liver damage. We present the case of an 81-year-old patient with a history of hypertension, ischemic heart disease, hypothyroidism, and biliary lithiasis, who developed hypoxic hepatitis secondary to Dunbar syndrome and a stenosis of the superior mesenteric artery. The patient improved symptoms and liver function tests with conservative management, including intravenous fluids and supportive care. Long-term management involved continued antiplatelet therapy and statins, with consideration of further interventions for celiac trunk stenosis. This case underscores the importance of recognizing Dunbar syndrome as well as superior mesentery trunk stenosis as a potential cause of hypoxic hepatitis. It highlights the need for multidisciplinary management in such cases.

Keywords

Dunbar Syndrome, Hypoxic Hepatitis, Stenosis of Mesentery Artery

1. Introduction

Hypoxic hepatitis, also known as ischemic hepatitis or shock liver, occurs when there is a significant decrease in blood flow to the liver, leading to liver cell injury and subsequent elevation of liver enzymes. One of the potential causes of hypoxic hepatitis is stenosis of the celiac trunk [1].

The celiac trunk is a major artery that supplies blood to the liver, stomach,

spleen, and other abdominal organs. If there is stenosis (narrowing) of the celiac trunk, it can reduce blood flow to the liver, resulting in liver ischemia (lack of oxygen). This ischemia can lead to liver cell damage and the development of hypoxic hepatitis [2].

Stenosis of the celiac trunk can be caused by various factors, including atherosclerosis (build-up of plaque in the arteries), thrombosis (blood clot), or compression by nearby structures. Treatment for hypoxic hepatitis related to celiac trunk stenosis typically involves addressing the underlying cause of the stenosis and improving blood flow to the liver [3]. This may include medications to manage conditions like atherosclerosis or interventions such as angioplasty or surgery to address the stenosis directly [3].

Hypoxic hepatitis is a clinical syndrome characterized by a rapid elevation of liver enzymes due to acute hepatocellular injury resulting from insufficient oxygen delivery to the liver. It is typically observed in conditions associated with severe hypotension or hypoperfusion, such as cardiac failure, shock, or respiratory failure. Although rare, celiac trunk stenosis can lead to reduced blood flow to the liver, resulting in hepatic ischemia and subsequent liver injury. Here, we report a case of hypoxic hepatitis related to stenosis of the celiac trunk.

2. Case Report

We report the case of an 81-year-old patient, hypertensive on amlodipine and followed for ischemic heart disease under antiplatelet therapy. Additionally, she has hypothyroidism under levothyroxine treatment and a biliary tract lithiasis discovered in the face of chronic abdominal pain treated by ERCP in 2021 with subsequent cholecystectomy.

Despite undergoing ERCP, the patient reports intermittent chronic pain, mainly postprandial and improving spontaneously; this pain was cyclical, every time this patient was faced with hypovolemia (urinary tract infection). She was admitted for management of hypochondrium pain without particular radiation evolving over one week. On examination, the patient was afebrile with a heart rate of 67 beats/min and blood pressure of 130/70mmHg. The patient was anicteric, and conjunctivae were normal in color. Abdominal examination revealed epigastric tenderness and a soft abdomen. The patient reports chronic mild abnormal liver test with cytolysis and cholestasis, with aspartate amino-transferase 160 U/L (4.5N), (10 - 35), GPT 57 (1.6N). Total bilirubin was elevated at 8 mg/dL (normal range: 0.2 - 1.2 mg/dL), and alkaline phosphatase (ALP) was mildly elevated at 212 U/L (normal range: 40 - 150 U/L). The coagulation profile and renal function were within normal limits. Serological tests for viral hepatitis (hepatitis A, B, and C) were negative.

Abdominal ultrasound revealed no evidence of gallstones or biliary obstruction. However, computed tomography angiography (CTA) confirmed the presence of celiac trunk stenosis of the median arcuate ligament and a 70% stenosis of the superior mesentery artery with collateral vessels supplying the liver. **Figure 1** and **Figure 2** show the patient's CT scan.

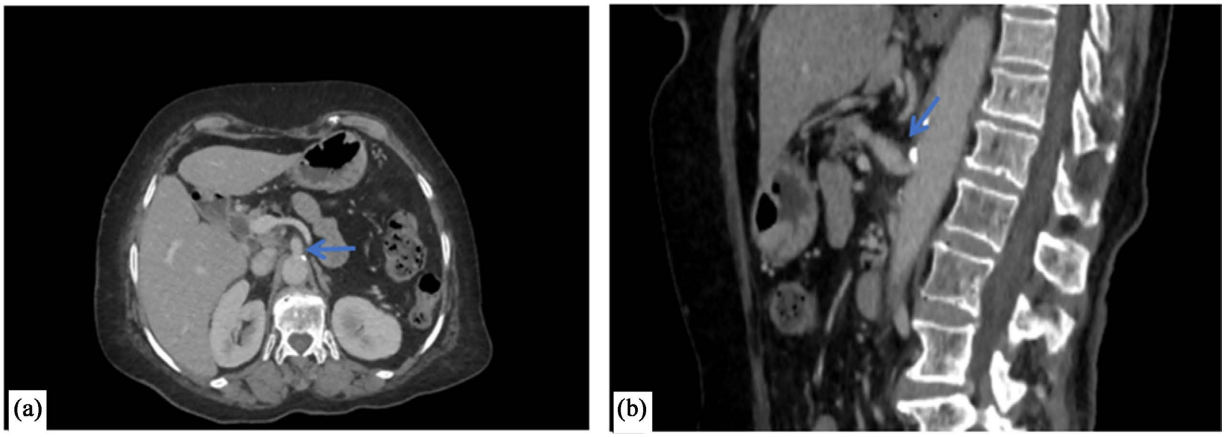

Figure 1. (a) Patient's contrast-enhanced CT axial image of the abdomen shows proximal celiac artery stenosis accompanied by post-stenotic dilatation. However, it is better appreciated in a sagittal CT image. (b) Section with magnification.

Figure 2. Patient's contrast-enhanced sagittal image of the abdomen showing proximal celiac artery stenosis accompanied by post-stenotic dilation.

The patient was diagnosed with hypoxic hepatitis secondary to insufficient blood flow. The diagnosis was made using biological and imaging criteria; this patient had abnormal liver function with stenosis of both the celiac trunk and superior mesenteric artery. Liver blood flow was insufficient, and this patient had right hypochondrium pain, jaundice, and cytolysis every time the blood flow to the liver was inadequate. In this patient, the underlying condition was sepsis due to a urinary tract infection.

3. Outcome

During hospitalization, the patient's symptoms gradually improved, and liver function tests showed a downward trend in serum enzyme levels. She was discharged with instructions for close follow-up with hepatology and vascular surgery clinics. Management strategies for ischemic hepatitis are conservatory treatment such as angioplasty, performed by surgeons or radiologic. Surgical revascularization is also an alternative to the liberation of the arcuate ligament.

However, due to the patient's age and underlying heart and thyroid condition, a conservative approach was opted for. The patient was put on antiplatelet therapy and statins with consideration for further angioplasty if there is a recurrence of symptoms. Table 1 summarizes the patient's findings.

Table 1. Summary of patient's findings.

Patients Findings	Results
Symptoms	Jaundice and right hypochondrium pain Fever and urinary tract infection
Biology	AST 160 U/L (4.5N), (10 - 35) ALT 57 (1.6N) (10 - 35) BT 8 mg/dL (0.2 - 1.2 mg/dL) ALP 212 U/L (40 - 150 U/L)
Abdominal US	Normal liver, no gall stone obstruction
CT Scan	Celiac trunk stenosis median arcuate ligament and also a 70% stenosis of the superior mesentery artery with collateral vessels supplying the liver
Treatment	Antiplatelet therapy and statins, angioplasty if recurrence

4. Discussion

Hypoxic hepatitis, also known as ischemic hepatitis or shock liver, is a rare clinical entity characterized by acute liver injury resulting from insufficient oxygen delivery to hepatocytes. While its incidence is relatively low compared to other liver diseases, hypoxic hepatitis carries significant morbidity and mortality, particularly in the context of severe underlying conditions such as shock or cardiac failure. Hypoxic hepatitis may arise from less common etiologies, such as vascular abnormalities affecting hepatic perfusion [4].

Due to its central role in metabolic processes and detoxification, the liver is highly sensitive to alterations in blood flow and oxygen delivery. Under normal physiological conditions, the liver receives dual blood supplies from the hepatic artery (providing oxygen-rich blood) and the portal vein (carrying nutrient-rich blood from the gastrointestinal tract). Disruption of either blood supply can lead to hepatic ischemia and subsequent hepatocellular injury [3].

In hypoxic hepatitis, the underlying pathophysiology involves a mismatch between oxygen demand and supply within hepatocytes, leading to cellular dysfunction and necrosis. Reduced oxygen delivery may result from systemic hypoperfusion, as seen in conditions like cardiogenic shock, septic shock, or respiratory failure. Additionally, localized vascular abnormalities, such as celiac trunk stenosis, can compromise blood flow to the liver, contributing to hepatic ischemia [4].

Celiac trunk stenosis, typically caused by atherosclerotic disease, leads to the narrowing of the celiac artery, which supplies blood to various abdominal organs, including the liver, stomach, and spleen. Significant celiac trunk stenosis can result in decreased perfusion to the liver, especially during periods of in-

creased metabolic demand or hemodynamic stress. Collateral circulation may develop to compensate for reduced blood flow, but it may be inadequate to meet the liver's oxygen requirements, particularly in acute stressors [3].

The clinical presentation of hypoxic hepatitis can vary widely depending on the underlying cause and the severity of liver injury. Common symptoms include abdominal pain, jaundice, nausea, vomiting, and malaise. Patients may also exhibit signs of hepatic decompensation, such as coagulopathy (elevated INR), hepatic encephalopathy, and ascites [4].

In the case of hypoxic hepatitis secondary to celiac trunk stenosis, patients may present with nonspecific abdominal symptoms, such as right upper quadrant pain or discomfort. Jaundice and dark urine may also be prominent features due to hepatocellular injury and impaired bilirubin metabolism. It is essential to recognize the potential association between abdominal vascular abnormalities and liver dysfunction, especially in patients with risk factors for atherosclerotic disease, such as hypertension, diabetes mellitus, and dyslipidemia [1].

The diagnosis of hypoxic hepatitis relies on a combination of clinical findings, laboratory tests, and imaging studies. Serum liver enzymes, particularly AST and ALT, are typically markedly elevated, reflecting hepatocellular injury. Elevations in serum bilirubin and alkaline phosphatase may also be observed, although the latter is often less pronounced in hypoxic hepatitis compared to cholestatic liver diseases [5].

Imaging modalities play a crucial role in identifying the underlying cause of hypoxic hepatitis and assessing hepatic perfusion. Abdominal ultrasound is often the initial imaging modality used to evaluate liver size, echotexture, and the presence of biliary obstruction or gallstones. Doppler ultrasound can provide additional information about blood flow patterns within the hepatic vasculature, including stenosis or occlusion in the celiac artery [3].

In cases where vascular abnormalities are suspected, computed tomography angiography (CTA) or magnetic resonance angiography (MRA) may be performed to visualize the celiac trunk and its branches. These imaging modalities can assess the degree of luminal narrowing, the presence of collateral circulation, and associated complications such as hepatic infarction or portal hypertension [4].

The management of hypoxic hepatitis revolves around addressing the underlying cause of hepatic ischemia and providing supportive care to optimize liver function. In cases of celiac trunk stenosis, the primary goal is to restore adequate blood flow to the liver through revascularization procedures. The choice of intervention depends on the severity of stenosis, the presence of collateral circulation, and the patient's overall clinical status [5].

Endovascular techniques, such as percutaneous transluminal angioplasty (PTA) with or without stenting, are often considered first-line interventions for celiac trunk stenosis. PTA involves dilating the stenotic segment of the artery using a balloon catheter, while stenting provides structural support to maintain luminal patency. These minimally invasive procedures can effectively improve hepatic perfusion and alleviate symptoms in many patients [4].

In cases where endovascular therapy is not feasible or unsuccessful, surgical revascularization may be necessary. Surgical options include bypass grafting or endarterectomy to bypass or remove the stenotic segment of the celiac artery, respectively. Surgical interventions are generally reserved for patients with severe stenosis, extensive vascular disease, or complications such as hepatic infarction or portal hypertension [5].

In addition to revascularization, supportive measures are essential for managing hypoxic hepatitis and preventing further liver injury. These include intravenous fluids to maintain hemodynamic stability, correcting electrolyte abnormalities, and closely monitoring liver function tests. Patients should be monitored closely for signs of hepatic decompensation, such as hepatic encephalopathy or coagulopathy, and managed accordingly [4].

The prognosis of hypoxic hepatitis depends on various factors, including the severity of liver injury, the underlying cause of hepatic ischemia, and the timely initiation of appropriate interventions. In cases of celiac trunk stenosis, prompt diagnosis and treatment are crucial for preventing irreversible liver damage and improving long-term outcomes [6].

With effective revascularization and supportive care, many patients experience resolution of liver enzyme abnormalities and symptom improvement over time. However, some individuals may develop complications such as hepatic fibrosis, portal hypertension, or liver failure, necessitating ongoing monitoring and management [5].

Close follow-up with hepatology and vascular surgery specialists is recommended for patients with hypoxic hepatitis secondary to celiac trunk stenosis. Serial liver function tests, imaging studies, and clinical assessments are essential for evaluating treatment response, detecting recurrent stenosis, and identifying potential complications [4].

5. Conclusions

Hypoxic hepatitis is a rare but potentially life-threatening condition characterized by acute liver injury secondary to reduced oxygen delivery to hepatocytes. While systemic hypoperfusion is the most common cause of hypoxic hepatitis, vascular abnormalities affecting hepatic perfusion, such as celiac trunk stenosis, should also be considered in the differential diagnosis.

Prompt recognition and appropriate management of celiac trunk stenosis are essential for preventing further liver injury and improving patient outcomes. Revascularization procedures, including endovascular techniques and surgical interventions, play a central role in restoring hepatic blood flow and alleviating symptoms. Supportive measures, such as intravenous fluids and close monitoring, are vital adjuncts to optimize liver function and prevent complications.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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