

Diffuse Nodulated Liver: a Case Report on Alcohol-Related Liver Pathology

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Abstract

Background: Diffuse nodulated liver (DNL) is a rare hepatic condition, that typically presents as diffuse micronodular transformation of the liver with or without fibrous septa. It is usually discovered incidentally during autopsy, and its appearance can be mistaken for cirrhosis or neoplastic conditions. This case highlights the clinical challenges of diagnosing DNL, particularly in individuals with a history of alcoholism, and emphasizes the need for increased awareness among clinicians.

Case presentation: A 27-year-old male was found deceased due to homicide and later underwent an autopsy. He was found to have DNL and the medical history revealed heavy alcohol consumption, but there were no prior significant diagnoses or treatments related to hepatic conditions.

Conclusions: Diffuse nodular liver, though rare and often incidental, is an important finding that can be mistaken for other hepatic pathologies. This case highlights the significant link between chronic alcohol consumption and liver disease, underscoring the potential severity of alcohol-related liver conditions.

Keywords: Diffuse nodulated liver, Liver cirrhosis, Chronic alcoholism and Liver injury

Introduction

Background

The liver is a vital organ with a range of complex functions, including synthesis, detoxification, metabolism, secretion, biotransformation, and immune defense (1,2). Its multifaceted roles are essential for maintaining overall health and homeostasis in the body. However, despite its remarkable regenerative capacity, the liver is susceptible to various forms of injury, including metabolic disorders, infections, trauma, and exposure to toxic substances like drugs and alcohol (3,4). Liver cirrhosis is the end result of chronic liver injury and persistent inflammation, which can arise from viral, metabolic, or autoimmune causes. It is characterized by extensive hepatic fibrosis and the alteration of normal liver architecture into regenerative nodules. As the final stage of chronic liver disease (CLD), cirrhosis can result from various etiologies, including excessive alcohol consumption, nonalcoholic fatty liver disease (NAFLD), viral hepatitis, and autoimmune disorders (5,6).

The progression of cirrhosis typically includes

asymptomatic phases, such as compensated cirrhosis, as well as more severe decompensated stages. These advanced stages can lead to debilitating complications, including ascites and gastroesophageal variceal bleeding (7,8). Ultimately, cirrhosis may progress to liver failure, a condition associated with significant morbidity and mortality. The implications of liver cirrhosis actually extend beyond individual health, imposing substantial burdens on global public health systems. Globally, approximately 1.5 billion individuals were estimated to have chronic liver disease in 2017 (9). Despite the global prevalence and disease burden of cirrhosis, data on the prevalence of cirrhosis, particularly in resource-limited settings, remains

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sparse (10). Diagnosing liver cirrhosis typically relies on invasive biopsy; however, this can be especially challenging in resource-limited settings like Tanzania, where access to such procedures may be limited (9-11).

Diffuse nodulated liver (DNL) is a rarely documented hepatic condition that is important for pathologists and clinicians to recognize, as it can easily be misdiagnosed as more common liver diseases, such as cirrhosis or metastatic liver disease. Although alcoholism is a known risk factor for various hepatic disorders, the specific relationship between alcohol consumption and DNL has not been thoroughly explored in the literature.

This manuscript presents a case report of DNL discovered during the autopsy of a young male with a significant history of alcohol use. The aim is to improve understanding of DNL, highlight its potential for misdiagnosis, and encourage further research into the impact of alcohol on liver pathology. Ultimately, the findings seek to raise awareness of DNL among healthcare professionals and foster discussions about its diagnostic criteria and management strategies.

Case Presentation

A 27-year-old male with a history of chronic alcoholism was found deceased and subsequently underwent an autopsy. His medical history revealed heavy alcohol consumption, but there were no prior significant diagnoses or treatments related to hepatic conditions.

Gross Examination

The autopsy revealed a liver with a diffusely nodular surface characterized by discrete, well-defined masses scattered throughout the organ (Figure 1). These nodules varied in size, ranging from small, pea-sized lesions to larger, grape-sized formations, with diameters generally between 1 and 2 cm. The nodules were present in all liver lobes. The color of the masses ranged from pale tan to a deeper brown, with some nodules exhibiting a slight yellowish tinge, suggesting areas of fatty infiltration or necrosis. The liver itself was not markedly enlarged but demonstrated a soft texture, interspersed with areas of firmer, nodular regions. This mixed consistency was indicative of the underlying pathological changes, including fibrosis and potentially cirrhosis, reflecting chronic injury or inflammation.

Microscopic Analysis

Histological examination demonstrated diffuse alterations in the liver parenchyma, characterized by a loss of normal architectural organization. A mixture of large and small hepatocytes was observed, along with compressed plates of hepatocytes, indicative of nodular regenerative hyperplasia. Importantly, there were no significant bands of fibrosis present, suggesting that the changes were not yet at an advanced fibrotic stage. The hepatocytes appeared largely intact, showing only mild

portal fibrosis and moderate steatosis, findings that align with alcohol-related liver disease (Figure 2).

Discussion

Chronic alcohol consumption can result in diffuse liver injury and fibrosis, predisposing individuals to various hepatic conditions. Alcoholic liver disease (ALD) is the

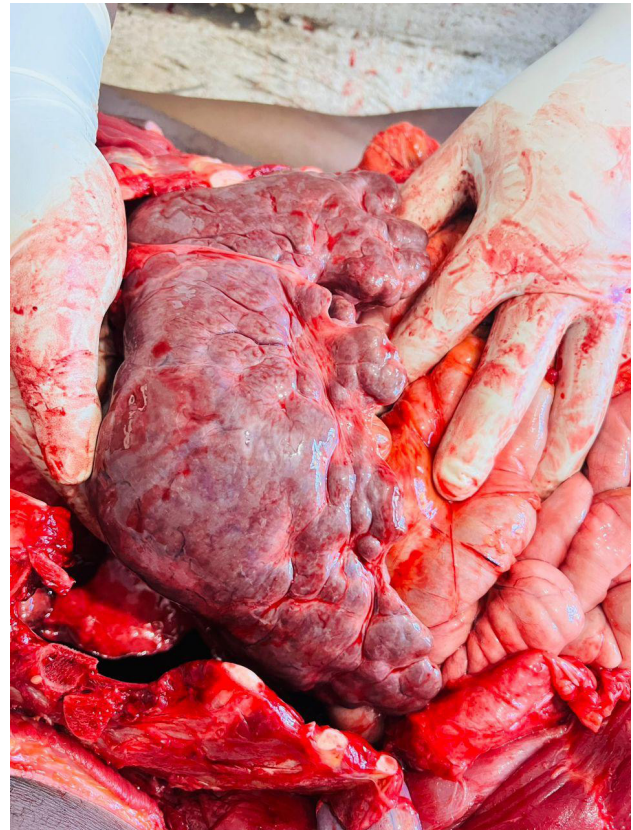


Figure 1: Gross appearance of a nodular liver at autopsy. The normal architecture of the liver parenchyma has been disrupted by the presence of these nodular formations.

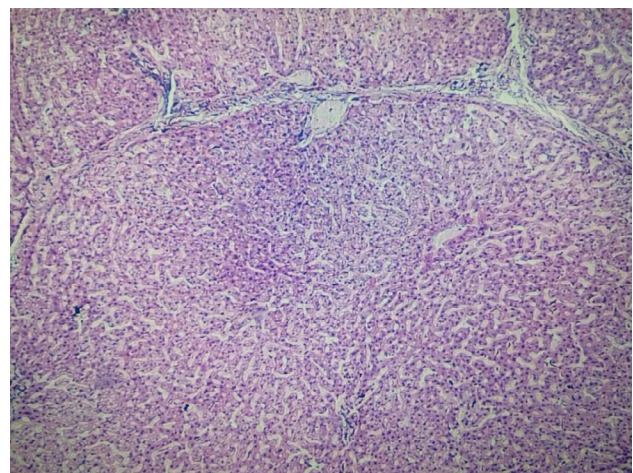


Figure 2: Microphotograph of a liver section illustrating the nodular appearance, characterized by a mix of large and small hepatocytes and the presence of regenerating nodules and hyper-cellularity (hematoxylin and eosin (H&E), 10 \times).

most prevalent form of chronic liver disease globally. The progression of ALD typically begins with alcoholic fatty liver (AFL), which can advance to alcoholic steatohepatitis (ASH), characterized by hepatic inflammation (12). While most individuals with alcohol use disorder will develop alcoholic fatty liver (AFL), only a subset will progress to more advanced stages of the disease. This variability in ALD phenotypes can be attributed to a combination of genetic, epigenetic, and non-genetic factors, highlighting the need for personalized approaches to diagnosis and treatment (12).

Despite the liver's remarkable regenerative capacity, it remains vulnerable to various forms of injury, including metabolic disorders, infections, trauma, and exposure to toxic substances such as drugs and alcohol (5). One rare and often under-recognized condition is diffuse nodulated liver (DNL), typically identified incidentally during autopsy. DNL is characterized by diffuse hepatic micronodular transformation, where nodules appear in clusters without fibrous septa separating them (13,14).

Clinically, the nodular transformation associated with DNL can easily be mistaken for cirrhosis, making histological evaluation of liver biopsy specimens essential for accurate diagnosis. This pathological assessment is crucial for differentiating DNL from other hepatic conditions, including neoplastic processes (14). DNL is often confused with cirrhosis or liver metastases due to its nodular appearance, but distinguishing features include the lack of well-circumscribed nodules and the diffuse nature of the nodularity. In this case, the patient's history of chronic alcoholism is significant as alcohol is known to induce diffuse hepatic changes, including steatosis and fibrosis, which might contribute to the development of DNL. These findings underscore the significant impact of chronic alcohol use on liver morphology, even in a relatively young individual. The presence of nodular regenerative hyperplasia and moderate steatosis indicates considerable hepatic insult from alcohol, highlighting the necessity for early detection and intervention in patients with a history of heavy drinking.

Conclusion

Diffuse nodulated liver, while rare and often incidental, is an important finding that can be confused with other hepatic pathologies. This case emphasizes the critical relationship between chronic alcohol consumption and liver pathology, serving as a reminder of the potential severity of alcohol-related liver disease. Clinicians should maintain a high index of suspicion for liver conditions in patients with a history of alcohol use, regardless of age.

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Conflict of Interest Statement

The authors declare no conflicts of interest related to this publication.

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