Fulminant hepatic failure: a case report
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Section: Abdominal imaging
Area of Interest: Abdomen
Procedure: Diagnostic procedure
Imaging Technique: Ultrasound
Imaging Technique: MR
Special Focus: Acute Case Type: Clinical Cases
Patient: 67 years, female

Clinical History:

A 64-year-old woman with no known diseases and no alcohol abuse in her history was admitted to our hospital because of hepatic dysfunction and cholestasis. She had elevated serum alkaline phosphatase, gamma-glutamyl transpeptidase, and serum aminotransferase levels. Serum viral hepatitis markers were negative.

Imaging Findings:

Abdominal ultrasound showed hepatomegaly with irregular liver contour and diffuse heterogeneity of liver texture with multiple, ubiquitous hyperechoic and hypoechoic micro- and macronodules. Enlargement of the spleno-portomesenteric venous system and mildly enlarged celiac lymph nodes were also seen.

An MRI examination of the abdomen was then performed, showing liver structure completely subverted by multiple, diffuse, party confluent nodules with low signal intensity on T1-weighted images, mixed signal intensity on T2-weighted images, and hypointensity compared to the surrounding liver tissue on contrast-enhanced fat suppressed T1-weighted images. Biopsy of liver lesions could not be carried out due to severe coagulopathy. The patient died of liver failure a few days later.

Discussion:

Fulminant hepatic failure (FHF), or acute liver failure, is a complex syndrome with multiple aetiologies characterised by an abrupt onset of jaundice and hepatic encephalopathy in the absence of preexisting liver disease [1]. Incidence is 2000 new cases per year in the United States [2]. Generally FHF is defined by reduced synthesis parameters of the liver, usually INR>1.5 and reduced detoxification resulting in any degree of encephalopathy. This is accepted by the exclusion of preexisting cirrhosis and a duration of a liver disease for less than 26 weeks. FHF can result from a wide variety of causes (e.g. idiopathic, drug toxicity, viral hepatitis, autoimmune hepatitis, and Wilson disease) but viral or toxin-induced hepatitis are the most common [3]. Hepatic encephalopathy is the hallmark of FHF in all classifications and clearly marks the transition from a severe condition to a deadly disease. FHF often causes multisystem organ failure. Frequently the presenting symptoms are nonspecific, including fatigue, malaise, anorexia, nausea, abdominal pain, fever, and jaundice. These symptoms progress to the development of encephalopathy and/or coma. Severe coagulopathy often precedes the evolution of hepatic encephalopathy to coma [4]. Ultrasonography is primarily the preferred imaging method in these conditions because it is a cost-effective, fast, and noninvasive technique without exposure to ionising radiation. Hepatic surface nodularity (focal relatively hyperechoic areas) is a common finding on US images and usually reflects a combination of alternating foci of
confluent regenerative nodules and necrosis rather than cirrhosis ("pseudocirrhosis"). The histopathologic findings
are massive hepatocyte necrosis with hepatic reticulation in framework collapse around nodular hepatocyte
regeneration. Such histopathologic findings differ from those of cirrhosis, which is characterised by regenerative
nodules and fibrous septa [5].
CT images shows areas of liver necrosis as low attenuation before administration of iodinated contrast material and
isosattenuation or hyperattenuation compared with areas of liver regeneration. On MRI, the necrotic liver parenchyma
appears as hypo- and hyperintense on T1- and T2-weighted images, respectively, whereas areas of regeneration
have the opposite MRI appearance [6]. Unfortunately, in our case it was impossible to elucidate the cause for
hepatic failure because the patient's history was apparently unremarkable and neither liver biopsy nor autopsy was
performed.
Liver transplantation is the only measure that can radically influence the course of FHF. Elucidation of the cause of
hepatic failure allows some patients to benefit from specific treatments and may influence posttransplant
management if transplantation is performed [2].
**Differential Diagnosis List:** Fulminant hepatic failure, Cirrhosis, Multifocal hepatocellular carcinoma, Metastasis

**Final Diagnosis:** Fulminant hepatic failure

**References:**

(PMID: 12530947)
Transplant 22: viii5–viii8 (PMID: 17890263)
Cakir B et al (2005) Unusual MDCT and Sonography Findings in Fulminant Hepatic Failure Resulting from Hepatitis
A Infection. AJR 185:1033–1035 (PMID: 16177428)
correlation with CT and MR findings. Radiology 198:239-242 (PMID: 8539386)
Description: US image shows diffusely irregular liver contour with multiple, ubiquitous hyper- and hypoechoic nodules. Origin: Department of Diagnostic and Interventional Radiology, University of Pisa, Italy
Description: US image shows diffusely irregular liver contour with multiple, ubiquitous nodules and a lymph node (arrow) at the hepatic hilum. Origin: Department of Diagnostic and Interventional Radiology, University of Pisa, Italy
**Figure 2**

**a**

**Description:** Axial dual-echo, in-phase image shows multiple hypointense, partly confluent nodules in both hepatic lobes. **Origin:** Department of Diagnostic and Interventional Radiology, University of Pisa, Italy

**b**

**Description:** Axial dual-echo, out-of-phase image shows multiple hypointense, partly confluent nodules in both hepatic lobes. **Origin:** Department of Diagnostic and Interventional Radiology, University of Pisa, Italy
Description: Axial SE T2-weighted image with fat saturation shows multiple nodules with mixed signal intensity in both hepatic lobes. Visible intrahepatic vessels are moderately collapsed presumably due to liver failure-related parenchymal oedema. Origin: Department of Diagnostic and Interventional Radiology, University of Pisa, Italy

Description: Axial GRE T1-weighted image with fat suppression obtained after intravenous injection of paramagnetic contrast medium shows multiple hypointense nodules with bilobar distribution. Origin: Department of Diagnostic and Interventional Radiology, University of Pisa, Italy