

The Sonographic Progression of Non-Alcoholic Fatty Liver Disease into Non-Alcoholic Cirrhosis of the Liver

MISERICORDIA
UNIVERSITY

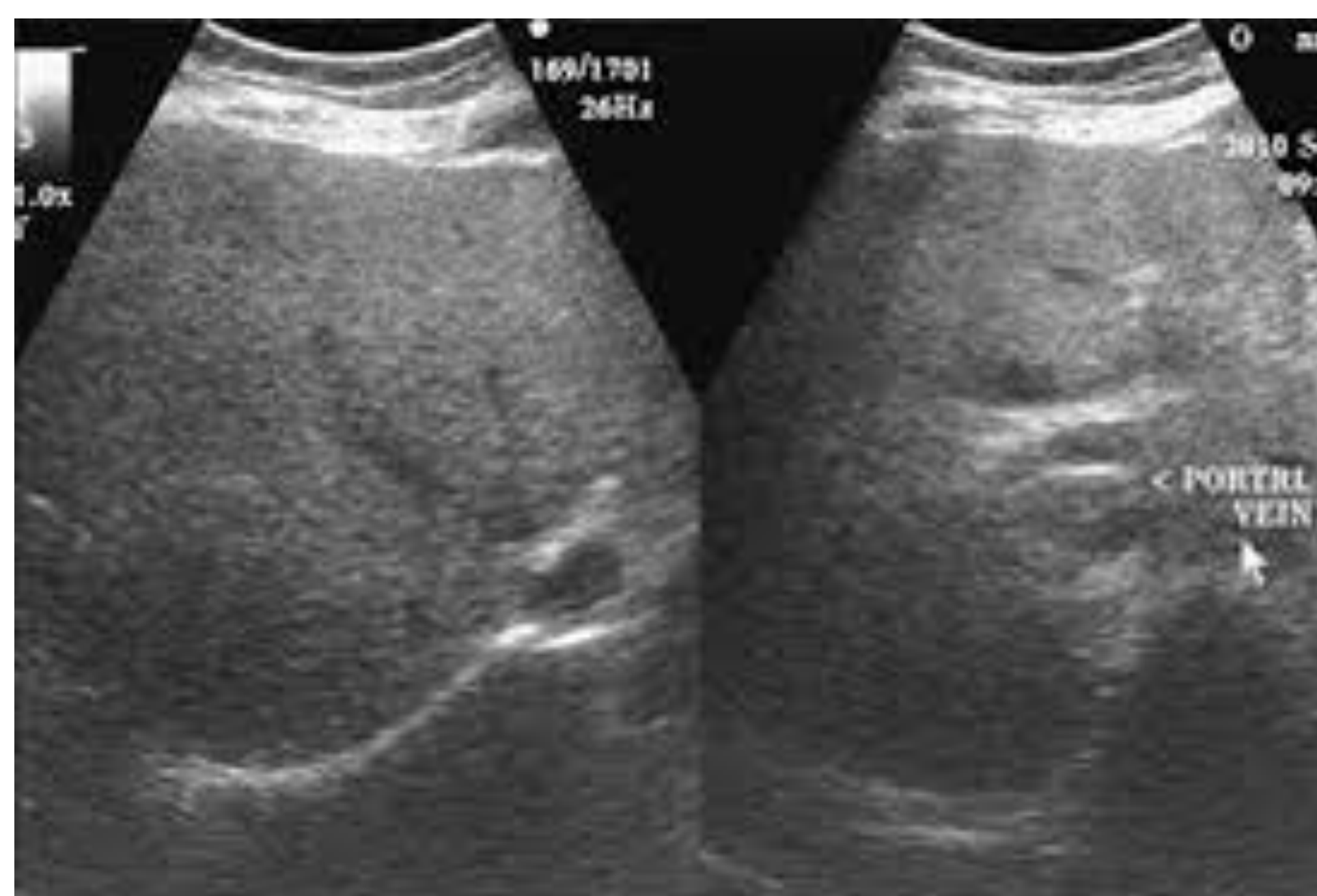
Student Researcher: Giana Tondora
Faculty Advisor: Karen L. Klimas, MS, R.T.(R), RDMS

Introduction

- Within the past 20 years, sonography has become the modality of choice for evaluation of the liver. Both alcoholic and non-alcoholic fatty infiltration and cirrhosis cases have become more prevalent at this time and it is crucial for the sonographer to provide the best diagnostic images possible. "Non-alcoholic fatty liver disease (NAFLD) is the most common liver disease in the United States" (Khov, Sharma & Riley, 2014). Since this disease is becoming more prevalent, it is important to understand the pathophysiology in order to provide the best prognosis possible.
- Non-alcoholic fatty liver disease often develops into cirrhosis of the liver after a few years.
- Cirrhosis of the liver should be monitored heavily while in the beginning stages because once liver cirrhosis reaches an advanced stage, it is irreversible.
- **Sonography** is the imaging modality which best determines the composition of the liver. Therefore, along with lab testing, it is the best screening tool for fatty infiltration of the liver or cirrhosis of the liver (Khov, Sharma, & Riley, 2014). Sonography uses non-ionizing radiation, therefore it is often favored over modalities such as CT that use ionizing radiation.

Non-alcoholic Fatty Liver Disease

Sonogram



Khanal U.P., Paudel B., Gurung G., Hu Y.S., Kuo C.W. (2019).

Types of Liver Cirrhosis

Alcoholic

Alcoholic liver cirrhosis occurs after alcohol has been heavily consumed over many years and the liver replaces healthy tissue with scar tissue. Alcoholic cirrhosis presents itself in the early stages as fatty liver disease. After fatty liver disease it progressed to alcoholic hepatitis and then finally alcoholic cirrhosis.

Non-alcoholic

While alcoholic cirrhosis is directly related to drinking, non-alcoholic cirrhosis can have multiple causes such as hepatitis B, hepatitis C, obesity, diabetes, and heart disease. Those medical issues cause scarring in the liver, therefore the liver is not able to filter toxins out of blood. The lack of filtration causes scarring. Some symptoms and complications of non-alcoholic cirrhosis is weakness, loss of appetite, weight loss, jaundice, ascites, pruritis, and vomiting blood (Felman, 2017).

The Sonographic Difference of a Normal Liver and a Liver with Cirrhosis

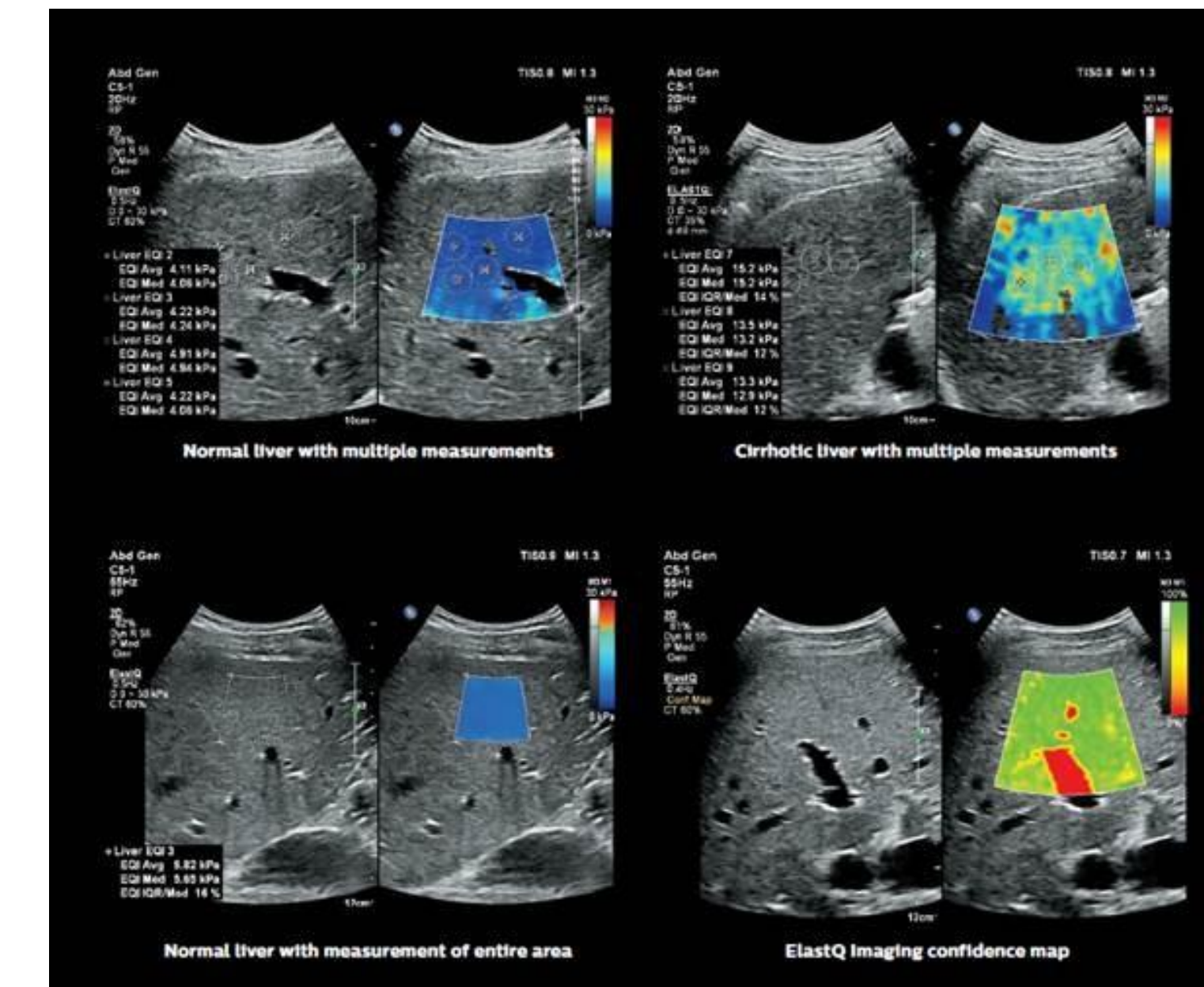


Hussain, M.A. (2017).

Liver Elastography

Liver elastography is a means of sonographically evaluating the composition of the liver by using an ultrasound probe designed for elastography set at a low frequency that sends out pulses in order to evaluate to composition of the liver. Elastography is used to evaluate the presence of scar tissue and the stiffness of the liver itself. After the pulses are sent, the results are generated and is scored. The information is then transferred to an interpreting radiologist to determine the grade (Michigan Medicine, n.d.).

Sonographic Liver Elastography

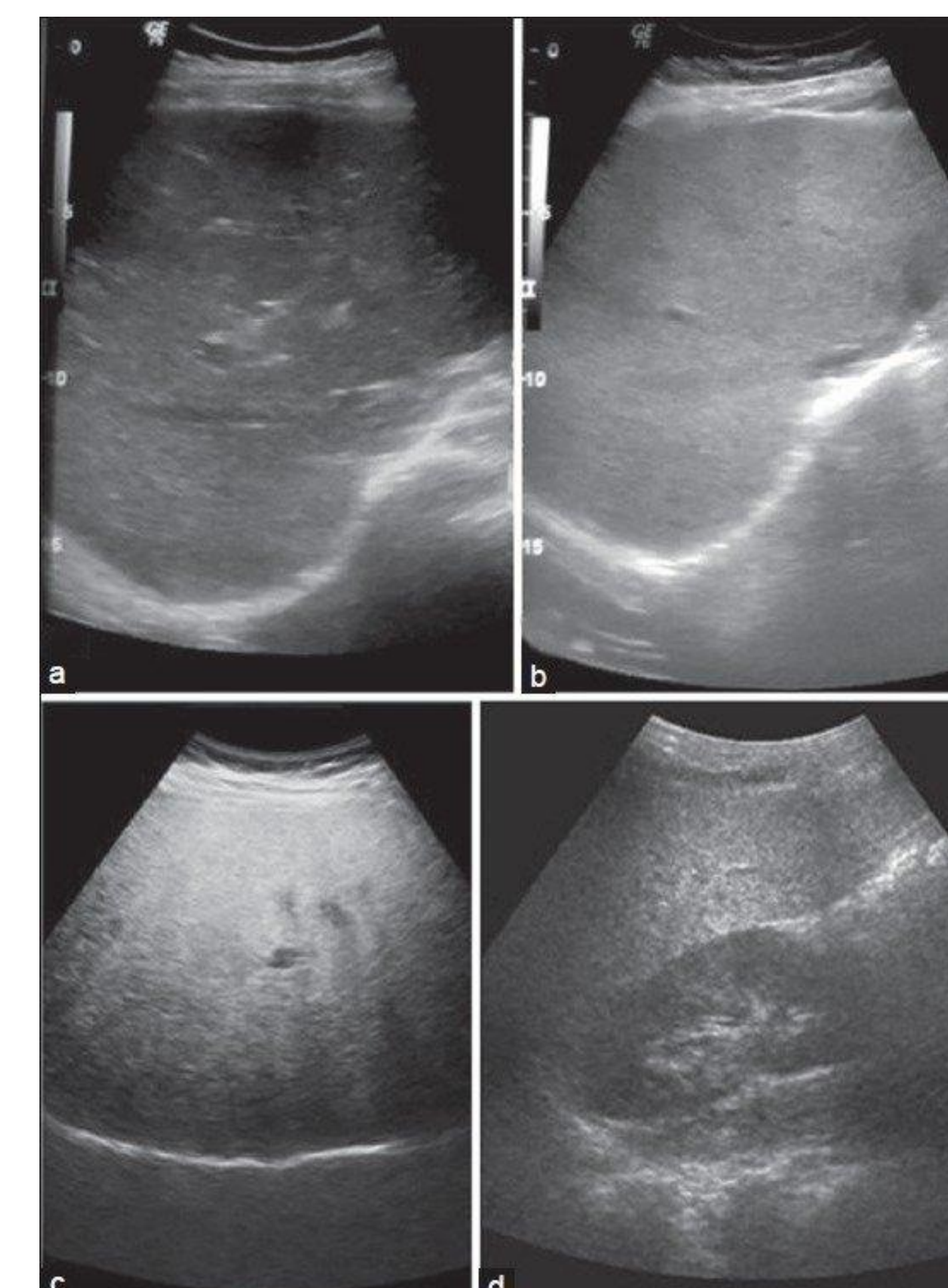


Horst, K. (2018).

Grades ranging from 1 to 3 can be given based on the visual sonographic appearance of the liver. A liver is labeled a level 1 fatty liver when the echogenicity is increased on the ultrasound. A liver is labeled a level 2 fatty liver when the echogenic liver obscures the echogenic walls of the portal vein. A liver is labeled a level 3 fatty liver when the echogenic liver obscured the diaphragm outline.

The image below shows (a) Normal liver echogenicity (b) Grade 1 fatty liver (c) Grade 2 fatty (d) Grade 3 fatty liver

Sonogram of Progression of Fatty Infiltration to Non-alcoholic Cirrhosis of the Liver

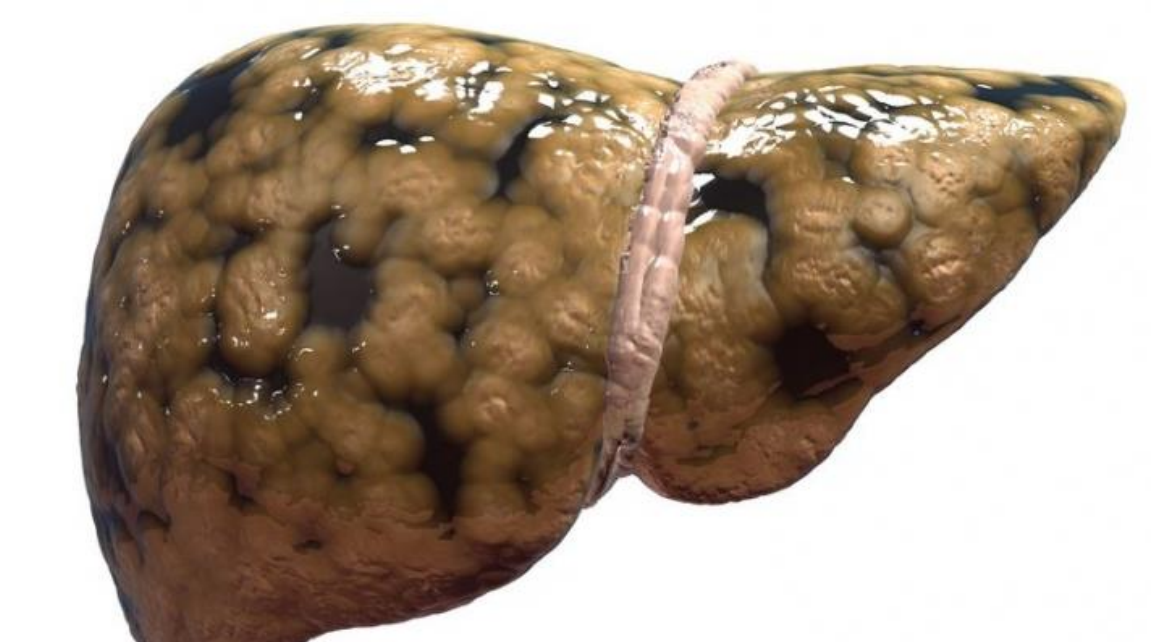


Singh, D. Das, C.J., Baruah, M.P. (2013).

Reversal of Non-alcoholic Cirrhosis

Once non-alcoholic cirrhosis is present, it most likely cannot be reversed and only treatments can be given to slow the disease's process depending what caused the cirrhosis. If the cirrhosis was caused by hepatitis B or C, antiviral drugs can be prescribed in order to suppress the immune system. If the cirrhosis is caused by diabetes or obesity, insulin will be given to the patient and it will be recommended that the patient maintains a nutritional diet and refrain from any alcohol. This nutritional diet should consist of cutting back on carbs and including foods and drinks in their diets that promote liver fat loss such as green tea, fiber, and whey protein. Supplements such as omega-3 fatty acid and berberine should be included in their diet as they both work in reducing blood sugar and improving liver health (Spritzler, 2016).

Non-alcoholic Liver Affected by Cirrhosis



Morstein, M. (2010).

Statistics

- "NAFLD is more common in people who have certain conditions, including obesity and conditions that may be related to obesity, such as type 2 diabetes." (NIDDK)
- "NAFLD can affect humans of any age. Research suggests that close to 10 percent of U.S. children ages 2 to 19 have NAFLD.4 However, people are more likely to develop NAFLD as they age." (NIDDK)
- "Once cirrhosis develops, prognosis is negatively impacted, with potential development of cirrhosis complications." (Hindawi)

Conclusion

Both alcoholic and non-alcoholic cirrhosis of the liver should be taken seriously in order to have the best prognosis possible. It is also important to have proper evaluation of the body through blood testing and multiple ultrasounds in order to determine the progression of this disease.

In order for the best prognosis, it is important to catch liver cirrhosis in the early stages such as fatty infiltration and make the necessary nutritional changes in order to stop the progression of the fatty infiltration into cirrhosis of the liver.