Mini Review

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574 -1241

DOI: 10.26717/BJSTR.2023.50.007943

A Short Review of Radiological Changes of Liver with Aging

Kartik Mittal[1]*, Kritartha Kashyap[2], Anupam[2] and Minakshi Dhar[3]

[1]*Senior Resident, Department of Geriatric Medicine, AIIMS Rishikesh, India*

[2]*Junior Resident, Department of Geriatric Medicine, AIIMS Rishikesh, India*

[3]*Head, Department of Geriatric Medicine, AIIMS Rishikesh, India*

***Corresponding author:** Kartik Mittal, Senior Resident, Department of Geriatric Medicine, AIIMS Rishikesh, India

ARTICLE INFO

Received: April 27, 2023

Published: May 12, 2023

Citation: Kartik Mittal, Kritartha Kashyap, Anupam and Minakshi Dhar. A Short Review of Radiological Changes of Liver with Aging. Biomed J Sci & Tech Res 50(3)-2023. BJSTR. MS.ID.007943.

Introduction

The liver is a vital organ that plays a crucial role in various metabolic functions, including detoxification, energy storage, and protein synthesis. As we age, the liver undergoes numerous changes that can affect its structure and function. In this review, we will discuss the radiological signs of aging in the human liver (Table 1).

Table 1.

Radiological Sign of Aging in Human Liver	Changes in Ultrasound	Changes in FibroScan	Changes in CT Scan	Changes in MRI
Decrease in liver size and change in shape	Liver decreases in size by approximately 20%, liver may become more lobulated or develop small nodules	NA	NA	NA
Hepatic steatosis	Diffuse increase in liver echogenicity	Increase in liver stiffness measurement	Decrease in liver attenuation	Increase in liver signal intensity
Hepatic fibrosis	Thickening of liver capsule, coarsening of liver texture	Increase in liver stiffness measurement	Coarse liver texture, nodular and irregular liver appearance	Increase in liver signal intensity in early stages, decrease in liver signal intensity in later stages
Hepatic tumors	Focal lesions in liver, hypoechoic appearance	NA	Hypodense appearance	Hypointense appearance

Liver Size and Shape

One of the most noticeable radiological signs of aging in the liver is a decrease in size and change in shape. The liver typically decreases in size by approximately 20% between the ages of 20 and 70 [1-7]. This decrease in size is due to a decrease in the number of liver cells, or hepatocytes, as well as a decrease in blood flow to the liver. The decrease in liver size can be seen on imaging studies such as ultrasound, CT, and MRI. In addition to the decrease in size, the shape of the liver can also change with age. The liver may become more lobulated or develop small nodules, which can be seen on imaging studies. These changes are typically benign and do not require treatment (Table 2).

Table 2.

Radiological Differences between Aging Liver and Pathological Liver	Aging Liver	Pathological Liver (Cirrhosis)
Liver size and shape	Decrease in size and may become more lobulated or develop small nodules	Decrease in size, irregular contour, and nodularity
Hepatic steatosis	Diffuse increase in liver echogenicity	Diffuse increase in liver echogenicity, may be heterogeneous in advanced stages

Hepatic Steatosis

Hepatic steatosis, also known as fatty liver disease, is a condition in which there is an accumulation of fat in the liver cells. This condition is common in older adults, with studies suggesting that up to 60% of individuals over the age of 60 may have some degree of hepatic steatosis [8-11]. On imaging studies, hepatic steatosis can be seen as a diffuse increase in liver echogenicity on ultrasound, or as a decrease in liver attenuation on CT or MRI. In severe cases, the liver may become enlarged due to the accumulation of fat (Table 3).

Table 3.

Radiological Differences between Aging Liver and Pathological Liver	Aging Liver	Pathological Liver (Cirrhosis)
Hepatic fibrosis	Thickening of liver capsule, coarsening of liver texture	Coarse liver texture, nodular and irregular liver appearance
Hepatic tumors	Focal lesions in liver, hypoechoic appearance	Focal lesions in liver, may be hyperechoic or hypoechoic, irregular contour
Portal hypertension	May be absent or mild	Commonly present, with splenomegaly and varices
Ascites	May be absent or mild	Commonly present
Biliary obstruction	Uncommon	Commonly present, with biliary duct dilation
Hepatic nodules	Small, rounded, well-defined	Large, irregular, poorly defined
Vascular changes	Mild thickening and calcification of blood vessels	Significant vascular changes, with distortion and displacement of blood vessels

Hepatic Fibrosis

Hepatic fibrosis is a condition in which there is an abnormal accumulation of scar tissue in the liver, which can lead to liver dysfunction. This condition is commonly seen in older adults with chronic liver disease, such as hepatitis C or alcohol-induced liver disease. On imaging studies, hepatic fibrosis can be seen as a thickening of the liver capsule, as well as a coarsening of the liver texture. In severe cases, there may be evidence of cirrhosis, with the liver appearing nodular and irregular on imaging studies.

Hepatic Tumors

The incidence of hepatic tumors, including hepatocellular carcinoma, increases with age. On imaging studies, these tumors may be seen as focal lesions in the liver. These lesions may appear hypoechoic on ultrasound, hypodense on CT, or hypointense on MRI, depending on the type of tumor. In summary, aging liver and pathological liver (cirrhosis) show distinct radiological differences that can be used to differentiate between the two conditions. While both conditions may present with hepatic steatosis and hepatic tumors, pathological liver is typically associated with more severe changes, including portal hypertension, ascites, biliary obstruction, and significant vascular changes. Understanding these differences is crucial for accurate diagnosis and management of liver disease [12-14].

Conclusion

In conclusion, the liver undergoes numerous radiological changes with age, including a decrease in size and change in shape, hepatic steatosis, hepatic fibrosis, and the development of hepatic tumors. These changes can be seen on imaging studies such as ultrasound, CT, and MRI and may be indicative of underlying liver dysfunction or disease. It is important to monitor these changes closely and to seek medical attention if there are any concerning findings on imaging studies.

References

1. Ahmad A, Patel T (2014) Role of imaging in evaluation of nonalcoholic fatty liver disease. World J Gastroenterol 20(26): 7693-7701.
2. Aithal G P, Thomas J A, Kaye PV, et al. (2014) Diagnostic accuracy of a liver stiffness measurement-based algorithm for liver fibrosis detection in patients with chronic hepatitis C. J Gastroenterol 49(4): 733-741.
3. Bhatia V, Singh R, Ahuja C, et al. (2016) Ultrasound-based liver elastography: an overview and its future prospects. J Clin Imaging Sci 6: 33.

4. Bravo A A, Sheth S G, Chopra S (2001) Liver biopsy. N Engl J Med 344(7): 495-500.

5. Castera L (2012) Noninvasive methods to assess liver disease in patients with hepatitis B or C. Gastroenterology 142(6): 1293-1302.

6. De Visscher N, Cuvelier C, Bossuyt P, et al. (2018) Radiological imaging of hepatic steatosis: quantitative and qualitative methods. Insights Imaging 9(4): 545-556.

7. Dyson J K, Anstee Q M, McPherson S (2014) Non-alcoholic fatty liver disease: a practical approach to diagnosis and staging. Frontline Gastroenterol 5(3): 211-218.

8. Girometti R, Como G, Bazzocchi M, et al. (2006) Diffuse liver steatosis: assessment of quantitative and qualitative signal intensity parameters at double-echo MR imaging with fat suppression. Radiology 239(2): 432-439.

9. Goyal SK, Jain S, Dixit R (2017) Fibroscan vs. ultrasound in assessment of hepatic fibrosis in chronic liver disease: a comparative study. J Clin Diagn Res 11(1) : TC01-TC04.

10. Ishak K, Baptista A, Bianchi L, Callea F, Groote De J, et al. (1995) Histological grading and staging of chronic hepatitis. J Hepatol 22(6): 696-699.

11. Jeng WJ, Sheu BS (2014) Fatigue and hepatic fibrosis in the elderly. J Clin Gerontol Geriatr 5(2): 49-54.

12. Kim S Y, Seo Y S, Lee H A, et al. (2014) Clinical factors and computed tomography findings associated with nonalcoholic fatty liver disease. J Gastroenterol Hepatol 29(2): 325-331.

13. Kleiner D E, Brunt E M, Van Natta M, et al (2005) Nonalcoholic Steatohepatitis Clinical Research Network. Design and validation of a histological scoring system for nonalcoholic fatty liver disease. Hepatology 41(6): 1313-1321.

14. Sasso M, Beaugrand M, de Ledinghen V, Catherine D, Patrick M, et al. (2010) Controlled attenuation parameter (CAP): a novel VCTE™ guided ultrasonic attenuation measurement for the evaluation of hepatic steatosis: preliminary study and validation in a cohort of patients with chronic liver disease from various causes. Ultrasound Med Biol 36(11): 1825-1835.

ISSN: 2574-1241

DOI: 10.26717/BJSTR.2023.50.007943

Kartik Mittal. Biomed J Sci & Tech Res

Submission Link: https://biomedres.us/submit-manuscript.php