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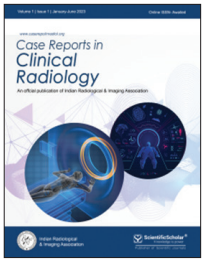

Guest Editorial

Why and how should radiologists validate and use the new ultrasound and magnetic resonance imaging quantification tools for metabolic liver diseases?

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Non-alcoholic fatty liver disease, recently renamed metabolic dysfunction-associated steatotic liver disease (MASLD), is one of the main causes of chronic liver disease and has become the 2nd leading cause of liver transplantation in the USA. This disease affects not only adults, but also adolescents and young adults. It is therefore a public health issue to diagnose MASLD and to be able to determine which patients are most at risk of progressing to cirrhosis and which patients are at risk of developing hepatocellular carcinoma.

- What methods are available to us? These are essentially ultrasound and magnetic resonance imaging (MRI)
- What are we trying to identify and quantify? Steatosis, hepatic fibrosis, and inflammation.

STEATOSIS

While liver biopsy remains a reference method, particularly for fibrosis and inflammation, MRI with measurement of proton density fat fraction has become an essential technique for quantifying steatosis because it is accurate and can detect small variations. The role of ultrasound in the diagnosis of steatosis has changed. For years, it was based on a crude assessment by the radiologist, but the most recent studies show that ultrasound attenuation measurement correlates well with steatosis. Other approaches are also being evaluated, such as backscattering or estimating the speed of sound propagation.

FIBROSIS

Fibrosis is the most important pathological element in MASLD because it is associated with the prognosis and progression of the disease. Ultrasound and MRI approaches are based on measuring the stiffness of the liver (ultrasound or magnetic resonance elastography).[1] Vibrations are produced (by the ultrasound probe or by an external transducer in MRI) which generate a compression wave converted in the liver into a shear wave perpendicular to the previous ones. Interestingly, the speed varies according to the stiffness of the tissue: Faster as stiffness increases.

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INFLAMMATION

Inflammation is one of the pathological elements that, if present, can transform simple steatosis into steatohepatitis and, therefore, a risk of complications. While the quantification of steatosis and fibrosis on imaging is well validated, the assessment of inflammation has yet to be consolidated. However, as with other variables, there is a correlation between tissue viscosity and shear wave dispersion.[2]

Why is non-invasive diagnosis so important? Because the evolutionary profiles of patients are different, because it is not easy to perform iterative biopsies on patients and because there are new treatments that are indicated for certain metabolic patients.[3]

HOW CAN WE ENSURE A RIGOROUS APPROACH?

The techniques for quantifying metabolic liver disease using ultrasound and MRI are well-known and reproducible. For radiologists, it is important to have been trained and to be aware of the limitations, quality criteria and confounding factors. It is also vital to use the tools in clinical practice to indicate the quality criteria and to include these results in the examination report.

It's up to you!

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