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Magnetic Resonance Elastography: The Beginning of a New Era in The Assessment of Liver Fibrosis

Mehmet H. Atalar[1,a,*]

[1] *Department of Radiology, Faculty of Medicine, Sivas Cumhuriyet University, Sivas, Türkiye*

**Corresponding author*

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ABSTRACT

Magnetic resonance elastography (MRE) offers a reliable, non-invasive assessment of liver fibrosis by quantitative stiffness measurement. As an alternative to biopsy, it offers assessment of the entire liver, and the recent development of 3D MRE extends its clinical potential by providing volumetric coverage.

***Keywords*:** Liver, Magnetic resonance elastography, Fibrosis, Portal hypertension

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Manyetik Rezonans Elastografi: Karaciğer Fibrozisinin Değerlendirilmesinde Yeni Bir Dönemin Başlangıcı

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ÖZ

Manyetik rezonans elastografi (MRE), karaciğer fibrozisinin non-invaziv değerlendirilmesinde güvenilir ve tekrarlanabilir bir yöntemdir. Biyopsiye alternatif olarak tüm karaciğerde kantitatif sertlik ölçümü yapar. Yeni geliştirilen 3D MR elastografi, hacimsel değerlendirme ile klinik uygulamalarda daha güçlü bir potansiyel sunmaktadır.

Anahtar Kelimeler: Karaciğer, Manyetik rezonans elastografi, Fibrozis, Portal hipertansiyon

Telif Hakkı

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[a] *mhatalar@gmail.com* *0000-0003-3076-8072*

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The global burden of chronic liver disease continues to increase, making accurate and reproducible grading of fibrosis essential to guide clinical management. For decades, liver biopsy has been considered the “gold standard", but its invasive nature, sampling variability and risk of complications emphasize the urgent need for reliable non-invasive alternatives.[1]

Magnetic resonance elastography (MRE) has proven to be a revolutionary tool in this context. By quantitatively measuring stiffness throughout the liver parenchyma, MRE shows a strong correlation with histologic fibrosis while offering high reproducibility.[1,2] Compared to ultrasound-based elastography, it has the advantage of less operator dependency and a higher technical success rate, even in obese or otherwise difficult patients.[2,3]

Recent findings emphasize the growing role of MRE beyond fibrosis staging. Studies demonstrate its value in predicting clinically significant portal hypertension, monitoring therapeutic response and integrating with multiparametric MRI for simultaneous assessment of liver fat (PDFF), iron overload (T2*) and functional liver

reserve.[3,4] A notable advance is the introduction of three-dimensional (3D) MRE, which allows volumetric acquisition of virtually the entire liver and provides insight into viscoelastic properties such as attenuation ratio and shear modulus.[5]

Although challenges remain- such as cost, accessibility and susceptibility to motion artifacts- these limitations are rapidly being overcome by technological advances and increasing clinical evidence. The future of hepatology may be defined by a shift towards non-invasive paradigms, with MRE, particularly in its 3D form, at the forefront as a candidate to replace biopsy in most clinical scenarios.

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