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EDITORIAL

# Real-Time Elastography in the Assessment of Advanced Fibrosis in Chronic Hepatitis C: Is It Here to Stay?

## Elastografia em Tempo-Real na Avaliação de Fibrose Avançada na Hepatite C Crónica: Está Cá para Ficar?

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Liver fibrosis is, undoubtedly, one of the main prognostic factors in liver disease because it determines the development of cirrhosis and its subsequent complications.[1]

Classically, liver biopsy has been considered the gold-standard for liver fibrosis assessment.[2] There are limitations associated to liver biopsy, namely sampling bias, observer variability among pathologists and potentially life-threatening complications.[3] Moreover, information provided by histological evaluation of the liver tissue obtained at biopsy is static, incapable of transmitting dynamic or functional regarding liver disease.

A number of non-invasive diagnostic tools for liver fibrosis evaluation have emerged in the last decade, and are generally defined as serological or mechanical. The most studied blood marker based indices include FibroTest, Fibrosis-4 index, Forns Score, aspartate-to-platelet-ratio APRI score and ELF score. Among mechanical methods are transient elastography (TE), MR elastography, acoustic radiation force impulse (ARFI), shear wave elastography (SWE) and real-time elastography (RTE).[4]

Real-time elastography is an imaging method that uses conventional ultrasound (US) probes to detect the physical properties of tissues, and requires analysis of color-coded elastograms in order to acquire semi-quantitative data. Linear probes are more commonly used because they are unchanged by depth-related distortion and B-mode positioning allows for selection of the region of interest.[5] During the RTE module, the operator's compression transmits a strain within the liver parenchyma and a strain profile is calculated along the compressed area.[6] New RTE technology does not require compression and can compute the automatic strain generated by the heartbeat.[7] In order to interpret the results two fibrosis indexes, Japanese and German, have been developed based upon the analysis of the histogram.[8,9]

Over the last 7 years, several studies have been published validating RTE for evaluation of liver fibrosis in diverse liver diseases and comparing it with other diagnostic modalities. One of the main limitations highlighted by authors is its lower reproducibility compared to TE.[10] Previous studies have concluded that in viral hepatitis (HCV and HBV) and non-alcoholic steatohepatitis, the elastic ratio method has a good correlation with liver biopsy, particularly in those with significant fibrosis (METAVIR score $F \geq 2$),[7,9,11,12] having surpassed blood markers in diagnostic accuracy.[13] Morikawa et al.[12] demonstrated that the RTE fibrosis index was particularly accurate for individuals with $F \geq 2$. On distinguishing significant from non-significant fibrosis in chronic hepatitis C (CHC) patients, Ferraioli et al.[7] showed that RTE fibrosis index was inferior to TE and APRI. Tamaki et al.,[14] on the

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contrary found that in patients with CHC, RTE liver fibrosis index was a very accurate tool in predicting advanced fibrosis ($F \geq 3$) and outperformed blood markers (APRI, FIB-4) in diagnostic capacity. A recent meta-analysis reported diagnostic accuracy for individuals with significant fibrosis, and underlined that RTE was not highly accurate for establishing cut-off stages of fibrosis.[15] The data supporting a role for RTE in diagnostic algorithm of liver fibrosis in CHC patients has been conflicting.

Marques et al. set out to determine its diagnostic accuracy, compare the RTE liver fibrosis index with serological markers and detect if anthropometric features significantly influenced histogram acquisition.[16] In this small prospective study, 32 patients had successfully obtained RTE histogram analysis. One of the main findings detected in this study pertains to one of the limitations of this tool. In this cohort of patients those with higher BMIs and abdominal wall thickness $\geq$23 mm had significantly lower histogram acquisition rates. This is an important point because it likens RTE to TE in its incapacity to evaluate patients with abdominal obesity. In addition, this study has confirmed that RTE is a useful tool to detect advanced or significant liver fibrosis corroborating data found in previous studies comparing RTE liver fibrosis index to other methodologies. RTE does not have high accuracy to select a cut-off for grade of fibrosis. This is probably one of the most important shortcomings associated to RTE. While with other non-invasive methods, such as TE and blood markers, cut-offs have been established for diverse liver diseases, the same does not hold true for RTE.

Due to some important deficiencies of RTE, it is not currently an optimal global tool for liver fibrosis staging. Advances in technology may increase its applicability in the future.

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