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Liver Elastography - USG

-Dr. Saba Shaikh

Elastography is a new imaging technique that measures the natural tendency of tissue to resume its original size and shape after being subjected to deforming force or stress and can produce an image based on tissue stiffness. This helps in assessing diffuse liver disease, especially the degree of fibrosis and in the diagnosis of focal liver masses for differentiation of malignant from benign pathologies.

The presence and extent of liver fibrosis is associated with disease progression and complications and hence early detection of fibrosis is crucial for the prognosis and management of patients with chronic hepatitis (HBV/HCV), liver cirrhosis.

There are two major types of ultrasound elastography:

- Shear wave elastography (SWE)
- Strain elastography (SE)

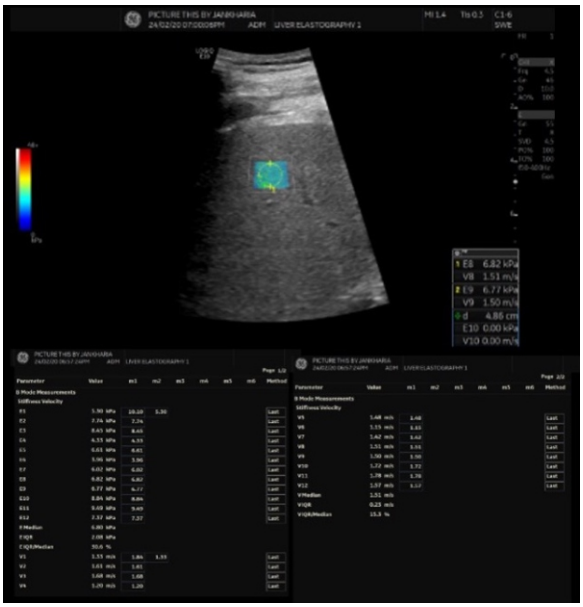

Fig. 1: Routine elastography (ARFI) scan with image and table with stiffness values.

Pre-Requisite: Fasting of 4-6 hours is recommended.

Procedure: Liver elastography examination is performed in suspended respiration in the left oblique position with assessment of the right lobe through an intercostal approach.

A minimum of 10 valid measurements in the same area in the right lobe of liver are obtained either in the form of Stiffness sample in kPa or shear velocities in m/sec, with reliability criteria based on Interquartile range (IQR)/median ratio and stiffness value.
The median values of the readings according to the Metavir score system are then considered for diagnosis. The grading of the hepatic fibrosis is then done using the Metavir Score which is as follows (Fig.1).

Stage	F	kPa	m/sec
Normal	F0	2.0-4.5	0.81-1.22
Normal-mild	F0-F1	4.5-5.7	1.22-1.37
Mild-moderate	F2-F3	5.7-12.0	1.37-2.00
Moderate-severe	F3-F4	12.0-21.0+	2.00-2.64+

(F0: Absent; F1: Enlarged fibrotic portal tract; F2: Peri-portal and initial portal-portal septa but intact architecture; F3: Architectural distortion but no obvious cirrhosis; and F4: Cirrhosis).

Limitations:
Obesity, Ascites, Narrow intercostal spaces

Grey zones:
Postprandial state, Acute hepatitis, Flares of transaminases, Deep inspiration, Congestive cardiac failure, Extrahepatic cholestasis

At a glance

- Liver elastography helps in assessing the extent of fibrosis in patients with diffuse liver disease
- The extent of fibrosis can be graded as well.

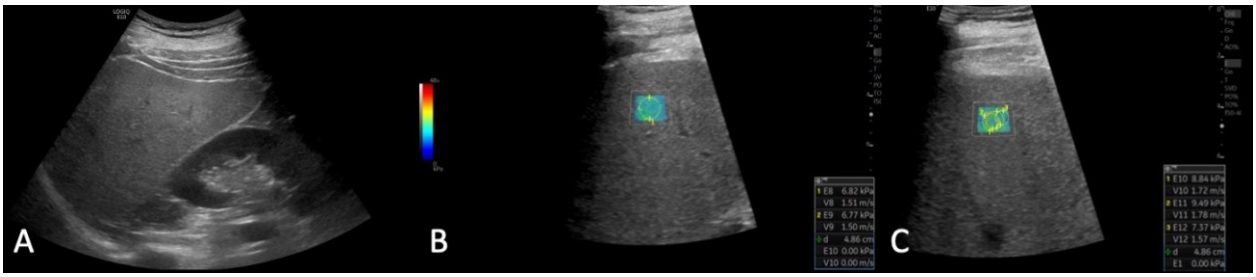

Fig. 2 (A-C): Patient with altered liver function tests. USG (A) shows normal-sized liver with coarse architecture. SWE images (B, C) show intermediate stiffness on colour coding with E median values of 6.80 kPa and V median value of 1.51 m/sec suggestive of borderline fibrotic

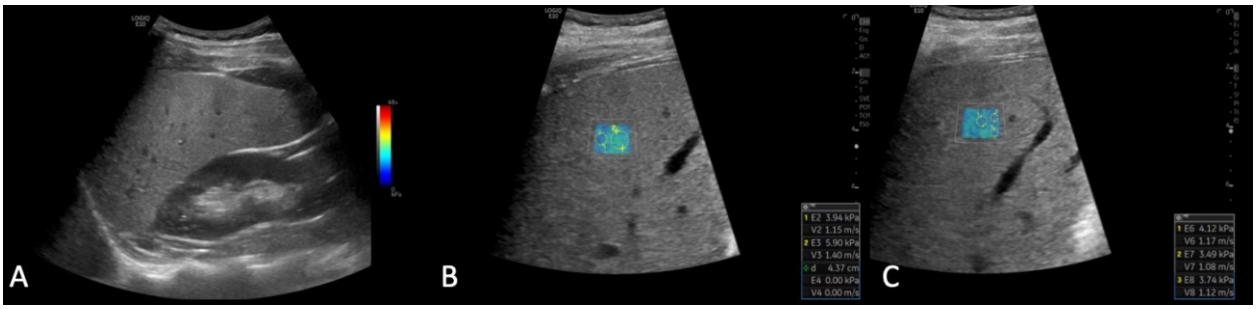

Fig. 3 (A-C): Patient with diffuse fatty infiltration of the liver on routine USG (A). SWE (B, C) images show intermediate stiffness on colour coding with E median value of 3.74 kPa and V median value of 1.12 m/sec which is within normal range.

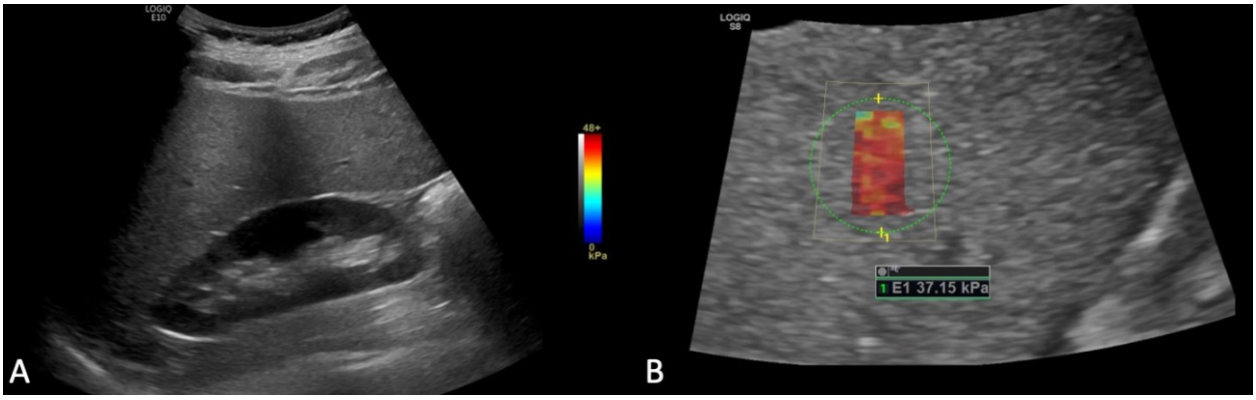

Fig. 4 (A, B): Patient suspected to have cirrhosis. USG (A) shows coarse heterogeneous hepatic echotexture. SWE (B) image shows increase stiffness on colour coding (red colour) and E median value 37.15 kPa and V median more than 2.64 m/sec suggestive of cirrhosis.

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