## LETTERS

# Liver stiffness measurement by transient elastography predicts early recovery from acute hepatitis

We read with interest the lead article by Casterà and Pinzani,[1] particularly the comment regarding the role of transient elastography (TE) in the context of acute hepatitis (AH).

The assumption that liver stiffness is determined exclusively by hepatic fibrosis has been challenged by evidence that patients with AH can have high values of liver stiffness measurement (LSM) by TE.[2] AH is a suitable model for studying the kinetics of LSM, since inflammation and necrosis increase rapidly and sometimes massively, but may revert with equal speed.

We evaluated 92 consecutive patients (mean age 41.8±16.3 years, 71.7% males) with symptomatic AH to assess how LSM was influenced by aetiology, and whether LSM kinetics correlated with the clinical course of AH. Twelve patients (13%) had acute hepatitis A virus (AHAV), 34 (37%) acute hepatitis B virus (AHBV), 26 (28.3%) acute hepatitis C virus (AHCV) and 20 (21.7%) drug-induced liver injury (DILI). TE was performed at the onset of symptoms of AH, and at 4, 8 and 12 weeks. At the onset of AH, all patients had values of serum alanine aminotransferase (ALT) at least 10 times above the upper normal limit, and jaundice was present in 70, 60, 42 and 27% of patients with AHBV, DILI, AHAV and AHCV, respectively (p=0.009). The median value of LSM was 12.2 kPa (range 3.6–45.0), and LSM correlated with ALT (r=0.346, p=0.001) and bilirubin (r=0.349, p=0.001). LSM was significantly different in the four groups of patients (p=0.003), and LSM >12 kPa, the predictive cut-off for the diagnosis of cirrhosis, was observed in 64, 46, 40 and 8% of patients with AHBV, AHCV, DILI and AHAV, respectively (p=0.010). Four patients with severe acute AHBV received lamivudine, one with severe DILI received steroids, and 20 with AHCV received interferon treatment. A progressive and significant reduction in LSM was observed in all groups of patients during follow-up. In the fourth week, 27, 38, 40 and 100% of patients with AHBV, AHCV, DILI and AHAV, respectively, had LSM <7 kPa. At week 8, the percentage of patients with LSM <7 kPa was 37, 50 and 50% for AHBV, AHCV and DILI, respectively. At week 12, the percentage of patients with LSM <7 kPa was 44, 58 and 66% for AHBV, AHCV and DILI, respectively (figure 1). To identify whether biochemical parameters and LSM predict the clinical course of AH, patients were analysed for early clinical recovery from AH (normal serum ALT values at week 4). By logistic regression analysis LSM was the only variable at presentation associated with early clinical recovery (OR 0.727, 95% CI 0.599 to 0.882, p=0.001). The receiver operating characteristic (ROC) analysis for the model was 0.84, and the best cut-off of LSM for identifying patients with early clinical recovery was 9.5 kPa (sensitivity 83%, specificity 70%, positive predictive value 41%, negative predictive value 96%, positive likelihood ratio (LR) 2.86 and negative LR 0.16).

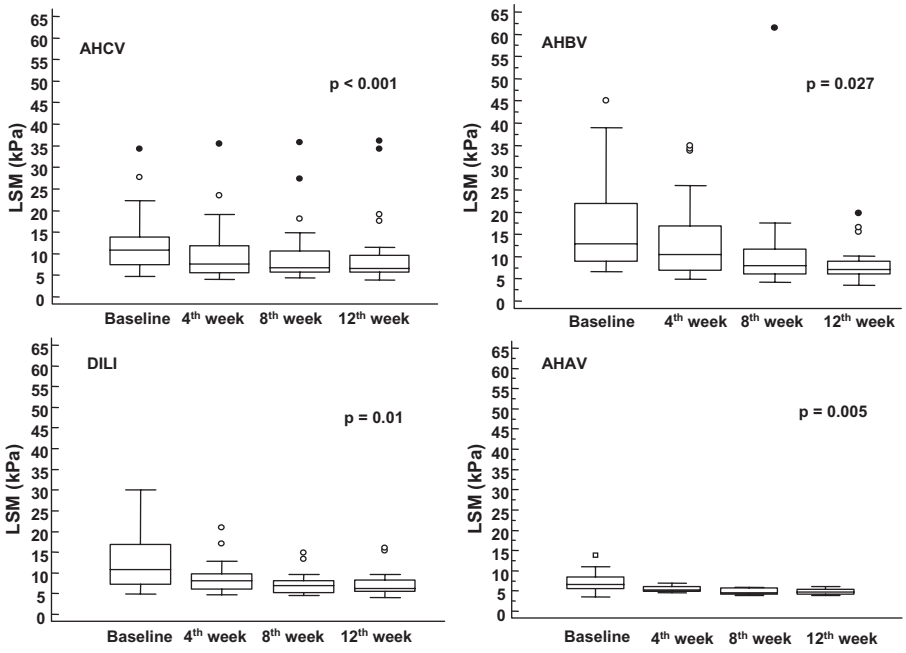


**Figure 1** Kinetics of liver stiffness measurement (LSM) during the clinical course of the different groups. AHAV, acute hepatitis A virus; AHBV, acute hepatitis B virus; AHCV, acute hepatitis C virus; DILI, drug-induced liver injury.

We concluded that LSM has a wide range of values in AH, reflecting different mechanisms of liver injury. In patients with AHAV who have prevalently a necrotic injury with scarce portal and periportal lymphocytic infiltration,[3] LSM rarely increases up to the values observed in patients with cirrhosis. Conversely, severe immune-mediated lymphocytic infiltration[4 5] can be the substrate for the increase in LSM in patients with AHBV or AHCV, and both inflammatory mechanisms and cholestasis[6] can increase LSM in patients with DILI. Finally, LSM is independently associated with early clinical recovery and could be used to monitor patients with AH.

**Vito Di Marco,[1] Vincenza Calvaruso,[1] Alessandra Iacò,[1] Fabrizio Bronte,[1] Luciano Biasi,[2] Katiela Prestini,[2] Paolo Sacchi,[3] Giuliana Amaddeo,[4] Giovanni Squadrito,[4] Raffaele Bruno,[3] Massimo Puoti,[2] Antonio Craxì[1]**

[1]Sezione di Gastroenterologia e Epatologia (Di.Bi.M.I.S.), University of Palermo, Italy; [2]Unità complessa di Malattie Infettive, AO Niguarda-Cà Granda, Milano Dipartimento di Malattie Infettive, University of Brescia, Italy; [3]Divisione di Malattie Infettive, University di Pavia, Italy; [4]Unità di Epatologia Clinica e Biomolecolare, University of Messina, Italy

**Correspondence to** Vito Di Marco, Dipartimento Biomedico di Medicina Interna e Specialistica, (Di.Bi.M.I.S.), University of Palermo, Piazza delle Cliniche 2, 90127 Palermo, Italy; vito.dimarco@tin.it

**Competing interests** None.

**Patient consent** Obtained.

**Provenance and peer review** Not commissioned; not externally peer reviewed.

Published Online First 9 December 2010

*Gut* 2011;**60**:1023. doi:10.1136/gut.2010.228478

## REFERENCES

1. **Castera L,** Pinzani M. Biopsy and non-invasive methods for the diagnosis of liver fibrosis: does it take two to tango? *Gut* 2010;**59**:861–6.
2. **Arena U,** Vizzutti F, Corti G, *et al*. Acute viral hepatitis increases liver stiffness values measured by transient elastography. *Hepatology* 2008;**47**:380–4.
3. **Masada CT,** Shaw BW Jr, Zetterman RK, *et al*. Fulminant hepatic failure with massive necrosis as a result of hepatitis A infection. *J Clin Gastroenterol* 1993;**17**:158–62.
4. **Ishii S,** Koziel MJ. Immune responses during acute and chronic infection with hepatitis C virus. *Clin Immunol* 2008;**128**:133–47.
5. **Sprengers D,** van der Molen RG, Kusters JG, *et al*. Analysis of intrahepatic HBV-specific cytotoxic T-cells during and after acute HBV infection in humans. *J Hepatol* 2006;**45**:182–9.
6. **Ramachandran R,** Kakar S. Histological patterns in drug-induced liver disease. *J Clin Pathol* 2009;**62**:481–92.

# Immediate effect on fertility of a gluten-free diet in women with untreated coeliac disease

In a recent paper in *Gut*, describing a Swedish population-based cohort, Zugna *et al* found

# Liver stiffness measurement by transient elastography predicts early recovery from acute hepatitis

Vito Di Marco, Vincenza Calvaruso, Alessandra Iacò, et al.

*Gut* 2011 60: 1023 originally published online December 9, 2010
doi: 10.1136/gut.2010.228478