

Prognostic value of cirrhotic features detected by ultrasound in patients undergoing tricuspid annuloplasty

SY Yu¹, Y Chen¹, YJ Yu¹, MZ Wu¹, QW Ren¹, YC Ho², KH Yiu¹

¹ Department of Medicine, The University of Hong Kong, Queen Mary Hospital, Hong Kong

² Department of Radiology, Queen Mary Hospital, Hong Kong

Abstract

Arising evidence has revealed that either acute or chronic heart diseases can directly contribute to liver dysfunction, which is characterized by the change of liver morphology in long term. Cardiohepatic syndrome describes the interaction between the heart and liver in patients with cardiac disease. Liver fibrosis is a continuum leading to liver cirrhosis if left untreated. The prognostic role of cardiohepatic syndrome in patients undergoing valvular heart surgery is however uncertain. This study aims to investigate the prognostic value of ultrasound derived features of liver cirrhosis in patients undergoing valvular surgery.

Acknowledgement: This research is supported by Health and Medical Research Grant, The University of Hong Kong.

Liver Outline	Frequency	Spleen Outline	Frequency	Presence of ascites	Frequency
Smooth	58	Normal	202	Absent	200
Early coarsening	72	Splenomegaly	12	Present	14
Coarsened	73				
Cirrhosis	11				

Table: Ultrasonography features of hepatobiliary system in 214 patients with valvular heart diseases

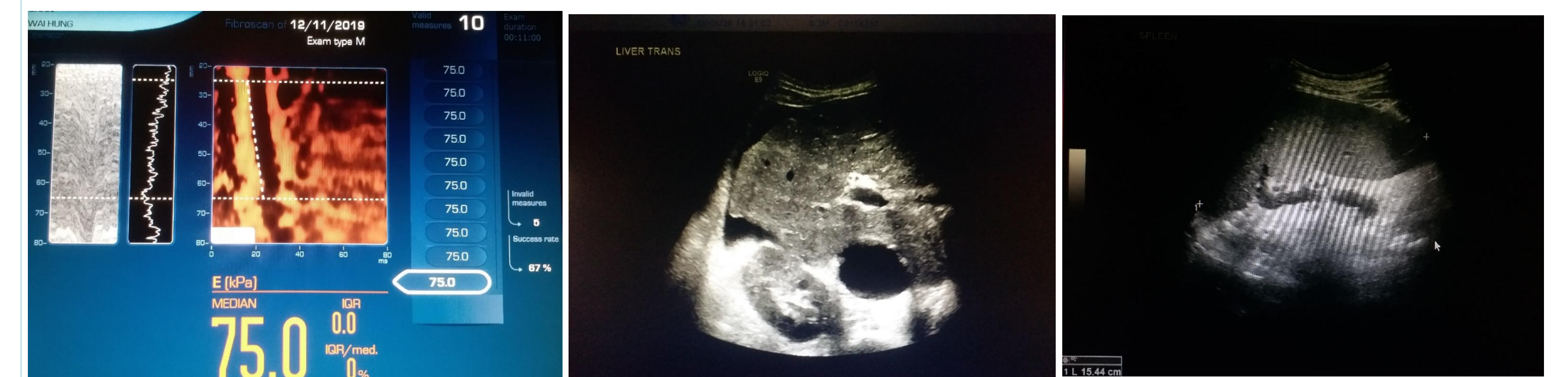
Introduction

Cardiohepatic syndrome describes the interaction between the heart and liver in patients with cardiac disease. The prognostic role of cardiohepatic syndrome in patients undergoing valvular heart surgery is however uncertain. This study investigated the prognostic value of ultrasound derived features of liver cirrhosis in patients undergoing valvular surgery.

Patients with more severe tricuspid regurgitation experience higher degree of liver fibrosis, which can be demonstrated by performing transient elastography (TE) (1). TE is considered as a fast, non-invasive clinical tool to assess liver stiffness (LS) in patients with chronic liver diseases. Nonetheless, LS does not always directly reflect the degree of liver fibrosis. In this case, ultrasonography of the hepatobiliary system, can be regarded as a more comprehensive examination to study the ultrasound derived features of liver cirrhosis in this particular group of patients.

Methodology

Consecutive patients (n=570) referred for pre-operative assessment for valvular surgery were recruited. Detailed echocardiography and liver stiffness assessed by transient elastography were performed. Patients with TE greater than 7kPa, indicating significant liver stiffness, were referred for detailed hepatobiliary system ultrasound to determine features of liver cirrhosis.



Figures 1-3: Ultrasound features of coarsening of liver, splenomegaly and presence of ascites are compatible in patient with high fibroscore performed by TE.

Discussion

A total of 214 patients who had significant liver stiffness received ultrasonography of the hepatobiliary system. Ultrasonography features of liver cirrhosis were observed in 11 patients, 12 patients with splenomegaly and 14 patients with ascites. Upon follow-up (median=16.4 months), 49 patients developed adverse outcome (28 hospitalisations for heart failure and 31 mortalities). Patients who developed adverse outcome had a higher frequency of ultrasound features of cirrhosis (12.2% vs 3.03%, P=0.05), splenomegaly (16.3% vs 2.4%, P<0.01) and ascites (20% vs 2.4%, P<0.01). Multivariable Cox regression confirmed that ultrasound features of cirrhosis (hazard ratio [HR]=5.309, 95% confidence interval [CI]= 1.502– 18.766, P=0.01), splenomegaly (HR=8.78, 95% CI interval = 2.358– 32.685, P<0.01) and ascites (HR=10.142, 95% CI= 2.899– 35.488, P<0.01) were independently predictive of adverse outcome in patients undergoing valvular surgery.

Conclusion

Patients undergoing valvular surgery had a high prevalence of cirrhotic changes, splenomegaly and ascites detected by ultrasound. Importantly, presence of cirrhotic feature, splenomegaly and ascites provide important prognostic value, supporting the use of ultrasound assessment of liver for risk stratification, in patients undergoing valvular surgery.

	Hazard ratio (HR)	95% Confidence interval [CI]	P value
Presence of cirrhosis	5.309	1.502– 18.766	0.01
Presence of splenomegaly	8.78	2.358– 32.685	<0.01
Presence of ascites	10.142	2.899– 35.488	<0.01

Table: Ultrasound features of cirrhosis, splenomegaly and ascites were independently predictive of adverse outcomes (HF hospitalizations and mortality) in patients undergoing valvular heart surgery by multivariable cox regression

Reference

Chen Y, Seto WK, Ho LM, Fung J, Jim MH, Yip G, et al. Relation of Tricuspid Regurgitation to Liver Stiffness Measured by Transient Elastography in Patients With Left-Sided Cardiac Valve Disease. *Am J Cardiol.* 2016;117(4):640-6.