

**SS 09 AB-01** 16:00 

## **Intrahepatic transit time using contrast-enhanced ultrasonography can estimate severe portal hypertension in liver cirrhosis**

Sang-wook Shin, Woo Kyoung Jeong, Yongsoo Kim,  
Min Yeong Kim, Joo Hyun Sohn

*Hanyang University Guri Hospital, Korea.*  
jeongwk@hanyang.ac.kr

**PURPOSE:** To investigate parameters of hepatic perfusion study to estimate severe ( $\geq 12$  mmHg) portal hypertension (PH) in liver cirrhosis using contrast-enhanced ultrasonography (CEUS).

**MATERIALS AND METHODS:** This prospective study was approved by our institutional review board. After getting informed consent, healthy volunteers ( $n = 7$ ) and patients with liver cirrhosis ( $n = 45$ ) who underwent hepatic venous catheterization through transjugular approach to measure hepatic venous pressure gradient (HVPG) also underwent CEUS of the liver parenchyma. Video clips were obtained using a built-in recording function on the US equipment at 8 to 10 frames/sec of frame rate for 3 minutes after contrast injection. To quantify perfused microbubbles in the liver, time-intensity curves were obtained by tracking regions of interest on cine images and subsequently analysed. Measurement of signal intensity was performed by using 'measure stack' function on ImageJ software. Hepatic vein transit time (HVTT), intrahepatic transit time (IHTT), peak signal intensity (PSI), arrival time to PSI (TPSI), and retention rate at 3 minutes after injection (RR3min) were explored as parameters of hepatic perfusion study. Spearman's correlation test was used to evaluate the relationship to HVPG and receiver operating characteristics (ROC) curve analysis was used for diagnostic performance of each parameter in estimating severe PH.

**RESULTS:** HVPG was correlated moderately with IHTT ( $\rho = -0.531$ ;  $p < .05$ ) and weakly with PSI ( $\rho = -0.281$ ;  $p < .05$ ), while HVTT, TPSI and RR3min were not significantly correlated ( $\rho = -0.252$ ,  $-0.052$  and  $0.212$ ;  $p > .05$ ). Areas under the ROC curves (AUROC) regarding diagnosis of severe PH ( $n = 37/52$ ), AUROC were 0.843 of IHTT and 0.728 of PSI (all  $p < .05$ ). IHTT under 7 seconds referred to severe PH with a sensitivity of 94% and a specificity of 60%.

**CONCLUSION:** Hepatic perfusion study using CEUS can be useful to estimate the grade of PH and to diagnose severe PH without need for catheterization.