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Measurement of liver fibrosis marker: type IV collagen 7S among patients with acute heart failure and its relationship with the Enhanced Liver Fibrosis (ELF) score

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Background: Hemodynamic disturbance in acute heart failure (HF) can cause injury to extra-cardiac organs such as the liver. Organ injury in HF might evoke a profibrotic response, which could adversely affect the prognosis.

Methods: Among 189 patients with acute HF, we simultaneously determined the liver fibrosis marker, type IV collagen 7S (P4NP 7S) and the Enhanced Liver Fibrosis (ELF) Score consisting of tissue inhibitor of metalloproteinases 1 (TIMP-1), amino-terminal propeptide of type III procollagen (PIIINP) and hyaluronic acid (HA) on admission and at discharge.

Results: During hospitalization, P4NP 7S and ELF score significantly decreased from 7.1 ng/mL to 6.1 ng/mL ($P<0.001$) and 10.39 to 10.13 ($P<0.001$), respectively. P4NP 7S and ELF score were correlated with each other on admission ($r=0.4$, $P<0.001$) and at discharge ($r=0.4$, $P<0.001$). %Change of (Δ) P4NP 7S during hospitalization was correlated with ΔBNP and ΔELF score ($r=0.3$, $P<0.001$ and $r=0.4$, $P<0.001$, respectively). Among the components of ELF score, PIIINP and HA were correlated with P4NP 7S on admission ($r=0.5$, $P<0.001$ and $r=0.3$, $P<0.001$, respectively) and at discharge ($r=0.4$, $P<0.001$ and $r=0.3$, $P<0.001$, respectively). ΔP4NP 7S was also correlated with ΔTIMP-1, ΔPIIINP and ΔHA ($r=0.3$, $P<0.001$, $r=0.4$, $P<0.001$ and $r=0.3$, $P<0.001$, respectively). Each patient was followed up up to 365 days after discharge. 69 patients died or were hospitalized for HF. When the patients were divided into two groups according to the median value of each marker at discharge, the cumulative 1-year incidences of all cause death or HF hospitalization were 32.0% and 45.5% in P4NP 7S-low and P4NP 7S-high group, respectively (log-rank P=0.051) and 43.2% and 34.9% in ELF score-low and ELF score-high group, respectively (log-rank P=0.44). After adjustment by the clinically relevant factors including age, sex, hemoglobin, sodium and left ventricular ejection fraction, P4NP 7S showed independent prognostic value (adjusted hazard ratio: 1.12, P=0.02), while ELF score did not (adjusted hazard ratio: 1.04, P=0.79).

Conclusion: Parallel elevation of P4NP 7S and ELF score were documented during acute phase of HF. P4NP 7S at discharge may identify patients at high risk for subsequent HF related events.