Long-term prognostic value of the combination of plasma volume status and pulmonary-systemic pressure ratio in patients admitted with acute decompensated heart failure

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Backgrounds: Plasma volume (PV) expansion plays an essential role in heart failure and PV status provides prognostic information in patients (pts) with acute decompensated heart failure (ADHF). On the other hand, concomitant presence of pulmonary hypertension in heart failure is associated with increased adverse events and may be related to interventricular uncoupling and impaired cardiac efficiency. It has recently been shown that an increased mean pulmonary artery pressure to mean systemic arterial pressure ratio (MPS ratio), a marker of interventricular coupling and efficiency, is associated with worse clinical outcomes in patients with advanced heart failure. However, there is no information available on the long-term prognostic value of the combination of PV status and MPS ratio in pts admitted for ADHF.

Methods: We studied 248 pts admitted for ADHF, who underwent right heart catheterization at the admission and were discharged with survival. PV status and MPS ratio were obtained at the admission. PV status was calculated as the following: Actual PV=(1-hematocrit) x [a+(b ? body weight)] (a=1530 in males and a=864 in females, b=41 in males and b=47.9 in females), Ideal PV=c ? body weight (c=39 in males and c=40 in females), and PV status=[(actual PV-ideal PV)/ideal PV]?100(%). The study endpoint was cardiovascular death (CVD).

Results: During a mean follow-up period of 5.2±4.4 yrs, 62 pts had CVD. PV status (10.0±16.2 vs 5.0±15.3%, p=0.03) and MPS ratio (0.408±0.114 vs 0.347±0.102, p=0.0001) were significantly greater in patients with than without CVD. At multivariate Cox regression analysis, PV status and MPS ratio were significantly associated with CVD, independently of prior heart failure hospitalization, eGFR, and serum sodium level and anemia. Patients with greater PV status (>median value=4.6%) and MPS ratio (>median value=0.346) had a significantly higher CVD risk than those with either and none of them (44% vs 22% vs 14%, p<0.0001, respectively).

Conclusions: The combination of PV status and MPS ratio might be useful for stratifying patients at risk for CVD in patients with ADHF.
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