Higher number vasopressor usage linked to poorer outcomes despite obtaining hemodynamic goals in acute myocardial infarction complicated by cardiogenic shock

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Introduction: Despite using vasoactive drugs to achieve hemodynamic goals in AMI-CS, the outcome of patients that achieve these goals and its relation with the number of drugs is uncertain.

Methods: 309 AMI-CS+PAC patients, divided by vasoactives 0-1, 2, or >2. Repeated measures ANOVA was used to compare 24-h hemodynamic data. The primary outcome was in-hospital mortality, and univariate and multivariate analyses were performed, adjusting for age, sex, type of MI, SCAI, multiorgan failure (MOF), and type of reperfusion. We also examined patients who achieved hemodynamic goals and analyzed the high achievers(≥5 goals) based on: MAP, CI, CPI, RAP, PCWP, and PAPI.

Results: 57 had 0-1, 76 =2, and 176 >2 vasoactives. Most patients were male(82%) with a median age 61(53-67) and had STEMI(82.8%). No differences in age, diabetes, previous HF, MI, PCI, CABG, smoking history, OHCA, or type of AMI. Killip-Kimball was overall worse in 2 and >2 groups(P<0.001). LVEF decreased as drugs increased (>2=30, 2=35, 0-1=40%; P<0.001). Higher leucocyte count, Cr, AST, ALT, LDH, and lactate with lower platelets, eGFR, and pH were seen as the number of drugs increased. No differences in Hb, electrolytes, albumin, C-reactive protein, primary reperfusion, angiography, number of vessels, or revascularization were noted. The use of mechanical ventilation and hemodialysis was lower in the 0-1 group. SCAI, MODS, MOF, and AKI were higher in 2 and >2 group. Mortality was higher in the >2 group(67.6) compared to 2 (31.6) and 0-1 (12.3%, P<0.001).

In the serial measures, CI (Fig1A), CPO, CPI (Fig1B), CPIRAP, SBP, MAP, and PAPI(Fig1D,C) had lower values in the >2 group compared with the 2 or 0-1(P<0.001), whereas higher RAP and PCWP were seen in the >2 group(P<0.001, 0.009, Fig1E,F). The number of vasoactives was an independent predictor of mortality, and the estimated probability of mortality was higher as the number of drugs increased, despite achieving hemodynamic goals(Fig1; blue= 0-1, green=2, red >2).

In the global cohort, patients receiving 2 or more vasoactive drugs had an increased hazard ratio compared to those receiving 0-1 drugs (Fig2C-D). Among high hemodynamic goal achievers (n=115), a difference in the Kaplan-Meier analysis was observed when compared with the 0-1 group, but no difference was seen with 2 drugs(HR 2.31[0.55-9.7; 0.252], HRadj 2.12[0.43-10.46; 0.358]). However, differences were observed when >2 drugs were used(HR 6.85[3.57-22.51; 0.002] and HRadj 7.38[1.96-27.77; 0.003])(Fig2B).

In addition, a comparison of each variable subgroup achiever showed differences between the 0-1 and >2 vasoactives even after adjustment. In contrast, when compared vs 2 vasoactives, only CI, CPI, CPIRAP, and PAPI retained significance after adjustment(Fig2C-D).

Conclusion: Despite achieving hemodynamic goals in AMI-CS, the use of more vasoactive drugs may result in poorer outcomes. Furthermore, investigating strategies to reduce vasoactives, such as upfront MCS is warranted.

Fig 1. Blue=0-1 Green=2 Red=>2 vasoactive
Fig 2.