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Use of intravenous vasodilators in patients hospitalized with acute heart failure: insights from Tokyo cardiovascular care unit network database

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Background: Despite recommendations from clinical practice guidelines, there is scant evidence confirming the effects of vasodilators on clinical outcomes in patients with acute heart failure (AHF).

Purpose: We sought to investigate the effects of intravenous vasodilators on clinical outcomes and to identify the potential patient populations that would benefit from its use.

Methods: Data of 26 212 consecutive patients urgently hospitalized for AHF between 2009 and 2015 were extracted from a multicenter data registration system (Tokyo Cardiovascular Care Unit Network Database, including 72 institutions within the Tokyo metropolitan area in Japan). Patients who did not present with typical AHF episodes, including those without pulmonary congestion on physical and/or chest X-ray and serum B-type natriuretic peptide level <500 pg/ml, as well as those who had hypotension and/or hypoperfusion (systolic blood pressure [SBP] <100 mmHg) as dominant presentation, were excluded. Propensity scores were calculated with multiple imputation and 1:1 matching performed between patients with and without vasodilators. The primary endpoint was in-hospital mortality and the secondary endpoints were length of intensive/cardiovascular care unit (ICU/CCU) stay and hospital stay.

Results: Overall, 8 863 patients were included in the present analysis;

they were predominantly male (57%) with a median age of 79 (interquartile range: 70–86) years. Compared with the group without vasodilator use, the vasodilator group had higher SBPs and heart rates and higher frequency of assisted ventilation use, but lower frequency of intravenous diuretics use. After propensity score matching, there were no significant differences in in-hospital mortality rates (7.8% vs. 8.9% in patients without vasodilators, $p=0.16$) or in length of ICU/CCU stay (5.8 days vs. 5.4 days, $p=0.44$) and hospital stay (22.7 days vs. 23.8 days, $p=0.22$) between the groups. However, in subgroup analyses, favorable impacts of vasodilator use on in-hospital mortality were observed among patients who had higher SBPs and among those who had no atrial fibrillation upon admission (Figure). In addition, vasodilators were likely to be more effective in AHF patients with SBP increasing; while levels below 140 mmHg of SBP appeared to be associated with an increased risk for mortality among patients treated with vasodilators compared with those without vasodilators.

Conclusions: In patients with AHF, vasodilator use was not universally associated with improved in-hospital outcomes; however, its effect was dependent of individual clinical presentation. Detailed phenotyping might aid tailoring of treatment strategies for patients with AHF.

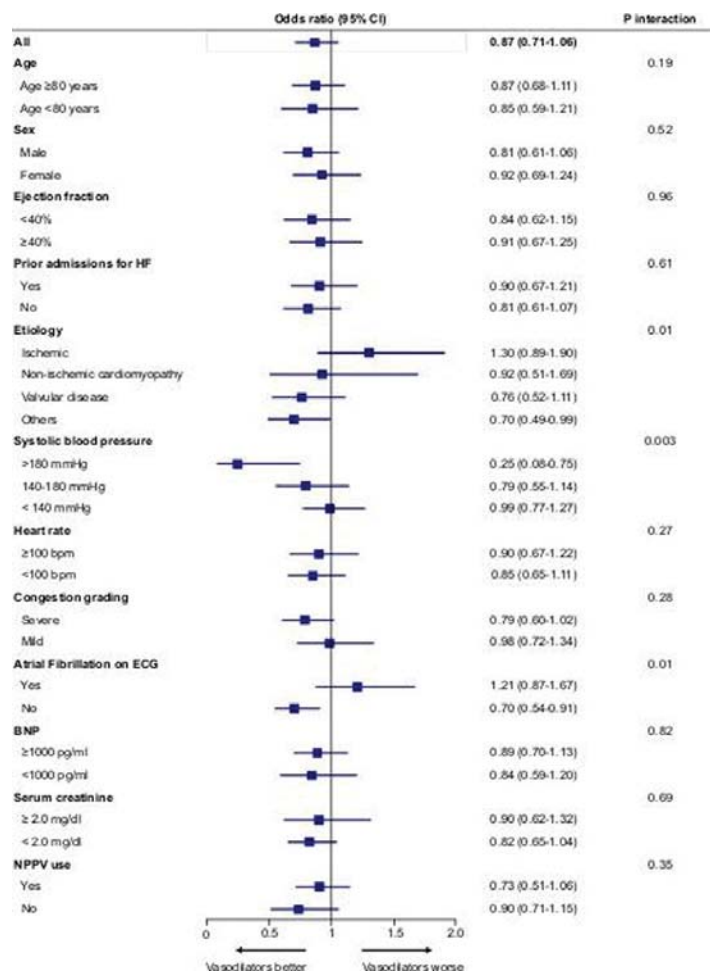


Figure 1