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The differential impact of renal resistive index on future cardiovascular event in the hospitalised cardiovascular patients according to left ventricular ejection fraction: J-VAS study

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Topic(s):
Chronic Heart Failure – Epidemiology, Prognosis, Outcome

Citation:

Introduction: Renal resistive index (RRI) not only reflects renal vascular hemodynamics but also correlates well with systemic arterial stiffness. RRI associated with cardiovascular events in the selected group of cardiovascular patients including heart failure (HF). However, previous study limited only in the preserved ejection fraction (EF) patients.

Purpose: To determine the differential impact of RRI on cardiovascular events among cardiovascular patients according to EF.

Methods: A retrospective analysis of the Jichi Vascular Hemodynamics in Hospitalised Cardiovascular Patients (J-VAS) cohort. EF and RRI were measured in all patients, then categorised into groups of reduced EF (rEF<40%), mid-range EF (mrEF 41-49%), and preserved EF (pEF=50%). The latter group was subdivided into RRI=0.8 and <0.8 to identify the risk of the primary endpoint, which was the composite of cardiac death, HF, acute coronary syndrome (ACS), aortic disease, arterial occlusion, and stroke.

Results: We included 1765 patients (mean age 64.7 years, 76% men). The most common diagnoses were ACS(66%) and HF(25%). During the median follow up of 1.9 years, 252 cardiovascular events occurred, 30.7%, 17.7%, and 10.4% in the rEF, mrEF and pEF group. RRI=0.8 associated with the primary endpoint in the patients with pEF (Hazard ratio(HR), 1.69; 95% confident interval(CI) 1.11-2.58), but the association was not found in the other EF groups. Multivariate Cox regression analysis putting the pEF with RRI<0.8 as a reference, pEF with RRI=0.8 had a comparable risk for the primary endpoint to the mrEF group (HR, 1.55; 95%CI, 1.04-2.30 and HR, 1.92; 95%CI, 1.31-2.80, respectively), while the risk was highest in the rEF group (HR, 3.80; 95%CI, 2.73-5.29).

Conclusions: The risk of cardiovascular events in cardiovascular patients with pEF related to renal vascular hemodynamic alterations justified by RRI. In the patients with pEF, those with high RRI had comparable risk to the mrEF patients.

<table>
<thead>
<tr>
<th></th>
<th>Preserved EF</th>
<th>Mid-range EF</th>
<th>Reduced EF</th>
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</thead>
<tbody>
<tr>
<td>HR (95%CI); P</td>
<td>2.05 (1.39-3.02); P &lt;0.001</td>
<td>1.60 (0.81-3.18); P =0.179</td>
<td>0.94 (0.53-1.67); P =0.838</td>
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<tr>
<td>Model 1</td>
<td></td>
<td>1.86 (1.25-2.78); P =0.002</td>
<td>1.33 (0.65-2.72); P =0.430</td>
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<tr>
<td>Model 2</td>
<td></td>
<td>1.69 (1.11-2.58); P =0.015</td>
<td>1.10 (0.51-2.36); P =0.810</td>
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<tr>
<td>Model 3</td>
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</table>

Adjusted hazard ratio of RRI=0.8 for the primary endpoint, RRI=0.8 associated with a significant risk for the primary endpoint in the pEF group but not in the mrEF and rEF group. Model 1 was adjusted for age, sex and body mass index (BMI). Model 2 was adjusted for age, sex, BMI, smoking, dyslipidemia, and diabetes. Model 3 was adjusted for age, sex, BMI, smoking, dyslipidemia, diabetes, and glomerular filtration rate (GFR).
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Log rank = 112.02

p < 0.001