Abstract: P3550

Changes in intrarenal venous flow and right ventricle-pulmonary circulation coupling from in-hospital admission to discharge in decompensated heart failure patients

Authors:
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Topic(s):
Chronic Heart Failure: Comorbidities

Citation:
Background
Intrarenal venous blood flow (IRVF) has been used to assess renal haemodynamics in heart failure (HF). In stable euvoemic HF patients, IRVF patterns are correlated with clinical outcomes independently of conventional prognostic factors. No studies are available about the use of IRVF in decompensated HF (DHF).

Purpose
We aimed at establishing the possible clinical use of IRVF and its relationship with right ventricle (RV)-pulmonary circulation (PC) coupling in a cohort of DHF patients admitted at our clinic.

Methods
15 DHF patients (mean age 72,6±9,8 years) with signs and symptoms of volume overload underwent a transthoracic echocardiography followed by renal ultrasonography and routine laboratory tests at admission and at pre-discharge (in stable euvoemic state after diuretic treatment). The IRVF was evaluated by Venous Impedance Index (VII).

Results
At discharge after depletive treatment resulted in clinical decongestion, we observed a reduction of VII (from 0,74±0,28 to 0,42±0,40; p=0,016) associated with reduction of pulmonary pressures and better RV to PC coupling (TAPSE/PASP ratio from 0,33±0,18 to 0,46±0,15; p=0,031). No significant differences in resistive index (RI), LVEF and renal function laboratory tests were detected. Results are shown in Table 1.

Conclusions
VII is a new non-invasive index that could identify renal hemodynamics alterations in HF patients. A high VII may be indicative of a congestive cardio renal syndrome in which an aggressive diuretic strategy can be set up with greater scientific evidence and the possibility of instrumental monitoring of its efficacy. Moreover, the development of drugs aimed at the improvement of the RV to PC coupling could lead to a better outcome in HF.

<table>
<thead>
<tr>
<th></th>
<th>Admission</th>
<th>Discharge</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII</td>
<td>0,74±0,28</td>
<td>0,42±0,40</td>
<td>0,02</td>
</tr>
<tr>
<td>LVEF (%)</td>
<td>43,7±17,5</td>
<td>42,7±16,3</td>
<td>0,87</td>
</tr>
<tr>
<td>TAPSE (mm)</td>
<td>14,9±4,1</td>
<td>17,1±3,6</td>
<td>0,14</td>
</tr>
<tr>
<td>PASP (mmHg)</td>
<td>51,9±15,2</td>
<td>39,4±11,6</td>
<td>0,02</td>
</tr>
<tr>
<td>TAPSE/PASP (mm/mmHg)</td>
<td>0,33±0,18</td>
<td>0,46±0,15</td>
<td>0,03</td>
</tr>
<tr>
<td>RI</td>
<td>0,8±0,1</td>
<td>0,7±0,1</td>
<td>0,11</td>
</tr>
<tr>
<td>Creatinine (mg/dL)</td>
<td>1,1±0,3</td>
<td>1,1±0,3</td>
<td>0,74</td>
</tr>
</tbody>
</table>

LVEF = left ventric. ejection fraction; BNP = natriuretic peptide; PASP = Syst art pulm press; RI = resistance index; TAPSE = tricuspid annular plane systolic excursion
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<table>
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<th>Admission</th>
<th>Discharge</th>
<th>p Value</th>
</tr>
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<tbody>
<tr>
<td>eGRF (mL/min/1.73 mq)</td>
<td>68.2±17.7</td>
<td>67.1±21</td>
<td>0.89</td>
</tr>
<tr>
<td>NT-proBNP (ng/L)</td>
<td>5663±5805.4</td>
<td>2047.2±2090.5</td>
<td>0.05</td>
</tr>
</tbody>
</table>

LVEF = left ventricle ejection fraction; BNP = natriuretic peptide; PASP = Syst art pulm press; RI = resistance index; TAPSE = tricuspid annular plane systolic excursion

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**Table 1:**

<table>
<thead>
<tr>
<th>IRVF Pattern</th>
<th>Admission</th>
<th>Discharge</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuous</td>
<td>1</td>
<td>8</td>
<td>0.01</td>
</tr>
<tr>
<td>Discontinuous</td>
<td>2</td>
<td>6</td>
<td>0.03</td>
</tr>
<tr>
<td>Monophasic</td>
<td>5</td>
<td>8</td>
<td>0.04</td>
</tr>
</tbody>
</table>

**Arterial flow**

\[
RI = \frac{\text{Max flow vel} - \text{Dias flow vel}}{\text{Max flow vel}}
\]

**Venous flow**

\[
VII = \frac{\text{Peak Max flow vel} - \text{flow vel Nadir}}{\text{Peak Max flow vel}}
\]

**IRVF pattern at admission and discharge**

- **Continuous:** Admission = 1, Discharge = 8
- **Discontinuous:** Admission = 2, Discharge = 6
- **Monophasic:** Admission = 5, Discharge = 8

P value 0.01, 0.03, 0.04