Clinical features, predictors, and long-term prognosis of pacing-induced cardiomyopathy

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Topic(s):
Antibradycardia Pacing

Citation:
Background: Right ventricular pacing sometimes has adverse effects on left ventricular (LV) structure and function. However, little is known about the clinical features, predictors, and long-term prognosis of pacing-induced cardiomyopathy (PiCM).

Purpose: We investigated the clinical features, predictors, and long-term prognosis of pacing-induced cardiomyopathy (PiCM).

Methods: From a retrospective analysis of 1,418 consecutive pacemaker patients, 618 were found to have a preserved baseline left ventricular (LV) ejection fraction (EF), follow-up echocardiographic data, and no history of heart failure (HF). PiCM was defined as a reduction in LVEF (<50%) along with either (1) a =10% decrease in LVEF or (2) new-onset regional wall motion abnormality unrelated to coronary artery disease.

Results: From a retrospective analysis of 1,418 consecutive pacemaker patients, 618 were found to have a preserved baseline left ventricular (LV) ejection fraction (EF), follow-up echocardiographic data, and no history of heart failure (HF). PiCM was defined as a reduction in LVEF (<50%) along with either (1) a =10% decrease in LVEF or (2) new-onset regional wall motion abnormality unrelated to coronary artery disease. PiCM occurred in 87 of 618 patients (14.1%), with a decrease in mean LVEF from 60.5% to 40.1%. The median time to PiCM was 4.7 years. Baseline left bundle branch block, wider paced QRS duration (=155ms), and higher ventricular pacing percentage (=86%) were identified as independent predictors of PiCM in multivariate logistic regression analysis. The risk of PiCM increased gradually with the number of identified predictors, becoming more significant in the presence of two or more predictors (p<0.001). During the entire follow-up duration (median 7.2 years), the risk of all-cause death or HF admission was significantly higher in patients with PiCM compared to those of non-PiCM patients (38.3% versus 54.0%, adjusted hazard ratio, 3.07; 95% confidence interval 1.90–4.94; p<0.001).

Conclusion: PiCM patients showed a worse long-term prognosis than those without PiCM. Therefore, patients with multiple risk factors of PiCM should be monitored carefully even if their LV systolic function is preserved initially. A timely upgrade to a biventricular pacing device needs to be considered in patients with PiCM.
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<table>
<thead>
<tr>
<th>Predictors</th>
<th>Hazard ratio</th>
<th>95% CI</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBBB</td>
<td>8.62</td>
<td>4.41-16.84</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>pQRSd ≥155ms</td>
<td>2.61</td>
<td>1.60-4.27</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>RV-P% ≥86%</td>
<td>2.42</td>
<td>1.59-3.69</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>No predictor +</td>
<td>Reference</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 predictor +</td>
<td>1.53</td>
<td>0.83-2.82</td>
<td>0.17</td>
</tr>
<tr>
<td>2 predictors +</td>
<td>3.68</td>
<td>2.11-6.42</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>3 predictors +</td>
<td>15.93</td>
<td>5.87-43.25</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

![Graph showing decreased and increased risk of PiCM](image-url)