

Device Therapy - Cardiac Resynchronisation Therapy (CRT)

The pacemaker ventricular lead position and outcomes in patients upgrading to crt

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Introduction:

Adverse hemodynamic effects of right ventricular pacing are known, and the optimal right ventricular lead position is still being a matter of debate. According to the guidelines, upgrade to cardiac resynchronization therapy (CRT) is recommended in patients with indication for pacemaker and left ventricular ejection fraction less than 50% or who need more than 40% of ventricular pacing.

Purpose:

To compare clinical outcomes and ejection fraction in patients with previous pacemaker (apical versus septal right ventricular pacing) who are upgraded to CRT.

Methods:

Single-center retrospective study of 94 consecutive patients who had previous pacemaker and upgraded to CRT over a 4-year period. Of these patients, 64 had previous apical lead pacemaker and 30 had previous septal lead pacemaker. Data on comorbidities, New York Heart Association (NYHA), left ventricular ejection fraction and hospitalizations due to heart failure were collected.

The results were obtained using Chi-square, Mann-Whitney and t-test.

Results: Patients with septal pacemaker had significantly more diabetes ($p = 0.04$) and chronic obstructive pulmonary disease ($p = 0.01$), tended to be more symptomatic ($p = 0.198$) and had more days of hospitalization before and after pacemaker implantation (12 ± 3 versus 7 ± 2 days and 8 ± 4 versus 3 ± 1 days, respectively), mostly due heart failure decompensation.

Although there were no significant differences in the initial ejection fraction in patients with apical or septal pacemaker implantation ($31.2 \pm 1.2\%$ and $29.1 \pm 1.5\%$, respectively, $p = 0.323$), the time to upgrade to CRT was significantly shorter in patients with septal pacemaker implantation (1999 ± 227 days versus 3005 ± 279 days, $p = 0.005$).

After upgrading to CRT, patients with apical lead had a significant increase in ejection fraction (8.2% , $p = 0.011$), while patients with septal lead had a non-significant improvement of ejection fraction (4.5% , $p = 0.448$). In both, apical and septal lead patients, there was a significant improvement in NYHA class after upgrade to CRT ($p = 0.03$ and $p = 0.02$, respectively).

Conclusion:

Although patients with septal lead had more comorbidities and hospitalizations due to heart failure, they do not benefit from the upgrade to CRT, unlike what happens in patients with apical lead. These findings can be explained by the fact that the septal lead minimizes ventricular desynchrony induced by right ventricular pacing.