The detrimental effect of right atrial pacing on left atrial function and clinical outcome in cardiac resynchronization therapy.

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Topic(s):
Resynchronization Therapy

Citation:

BACKGROUND
Data on the effects of right atrial (RA)-pacing on left atrial (LA) synchronicity, function and structure after cardiac resynchronization therapy (CRT) are scarce.

OBJECTIVE
To assess the impact of RA-pacing on LA-physiology and clinical outcome.

METHODS
The effect of RA-pacing on LA-function, morphology and synchronicity was assessed in a prospective imaging cohort of HF-patients in sinus rhythm with guideline indication for CRT. Additionally in a retrospective outcome cohort of consecutive HF-patients undergoing CRT-implantation the relation of RA-pacing was assessed with various outcome endpoints. High versus low atrial pacing burden was defined as atrial pacing above or below 50% in both cohorts.

RESULTS
Thirty-six patients were included in the imaging cohort (age=68±11years). Six-months after CRT, patients with high RA-pacing burden showed less improvement in LA-maximum volume, minimum volume and total emptying-fraction (p<0.05). Peak atrial longitudinal strain, reservoir and booster strain-rate but not conduit strain-rate improved after CRT in patients with low RA-pacing burden and worsened in patients with high RA-pacing burden (p<0.05 for all). A high RA-pacing burden induced significant intra-atrial dyssynchrony (maximum-opposing-wall-delay; 44±13msec vs 97±17msec, p=0.022) (see figure). A total of 569-patients were included in the outcome-cohort. After covariate adjustment, a high RA-pacing burden was associated with LV-reverse remodeling (β=0.146,95%CI= [3.101;14.374],p=0.002), and new-onset or recurrence of atrial fibrillation (AF; 41% vs. 22% at median 31 [22-44] months follow-up; p<0.001). There was no difference in time to first HF-hospitalization or all-cause mortality (p=0.185) after covariate adjustment. However in a recurrent event analysis, heart failure readmission were more common in patients exposed to a high RA-pacing burden (p=0.002).

CONCLUSIONS
RA-pacing in CRT patients negatively influences LA-morphology, function and synchronicity, which is associated with worse clinical outcome including diminished LV- reverse remodeling, increased risk for new-onset or recurrent AF and heart failure readmission. Strategies reducing RA-pacing burden might be warranted.
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