Alternative sites for CRPacing

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WHY?
NEWS FROM THE HEART RHYTHM SOCIETY

2023 HRS/APHRS/LAHRS guideline on cardiac physiologic pacing for the avoidance and mitigation of heart failure
From left to right, ECG imaging epicardial activation maps for intrinsic QRS, selective His bundle pacing, nonselective His bundles pacing and biventricular pacing (BVP) in a single patient with a normal QRS duration and morphology. Above are maps of the right ventricle (RV) and below of the left ventricle (LV). The color scale on the left indicates the activation times. Selective HBP activates both ventricles identically to intrinsic rhythm. Nonselective HBP pacing activates the LV identical to selective HBP and intrinsic rhythm but on the RV maps there is evidence of early (red) activation in the basal and mid ventricle, indicate capture of local right ventricular myocardium alongside the bundle of His. Biventricular pacing activates the heart with an entirely different pattern with earliest activation (red) in the LV. Courtesy of Ahran Arnold and Zachary Whinnett, Imperial College London, United Kingdom.
WHAT?
**FIGURE 1**

Schematic diagram of pacing electrode positions of different CRT modalities. BVP, biventricular pacing; CRT, cardiac resynchronization therapy; HBP, His bundle pacing; HOT-CRT, His-optimized CRT; LBBAP, left bundle branch area pacing; LOT-CRT, LBBAP-optimized CRT.
Cardiac physiologic pacing (CPP) is defined here as any form of cardiac pacing intended to restore or preserve synchrony of ventricular contraction. CPP can be achieved by engaging the intrinsic conduction system via conduction system pacing (CSP; which includes His bundle pacing or left bundle branch area pacing) or cardiac resynchronization therapy (CRT), the latter most commonly achieved by biventricular (BiV) pacing using a coronary sinus branch or epicardial left ventricular pacing lead.
Possible candidates for CPP

- High RVP burden (40%) has been associated with an increased risk of HFH as observed in the Mode Selection Trial (MOST).
- The incidence of PICM in observational cohorts has ranged from 5.9% to 39%.
- A systematic review of 26 studies (6 prospective) on nearly 58,000 patients showed a pooled prevalence of 12% of PICM using 15 unique definitions from 23 publications.

### Recommendations for detection of electrical dyssynchrony–induced cardiomyopathy

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<td>1</td>
<td>B-NR</td>
<td>1. In patients who have substantial RVP that cannot be minimized with programming, periodic assessment of ventricular function is recommended to detect pacing-induced cardiomyopathy.</td>
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<td>2a</td>
<td>B-NR</td>
<td>2. In patients with chronic LBBB, periodic assessment of ventricular function is reasonable to detect cardiomyopathy.</td>
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Is Gender important?
Patients with congenital heart disease

- Systemic LV, LVEF <45%, and ventricular dyssynchrony
  - CRT with BiV pacing (2a, C-LD)
    - Requiring pacing
      - Apical pacing in preference to nonapical (2a, C-LD)
    - Symptomatic HF
      - CRT with multisite pacing (2b, C-LD)
- Systemic single ventricle
- Systemic RV and symptomatic HF
  - CRT with BiV pacing (2b, C-LD)
- CCTGA and AV block without anatomic repair
  - CSP with HBP or LBBAP (2b, C-LD)
- Subpulmonary RV with RV dysfunction and RBBB
  - CRT with fusion-based pacing (2b, C-LD)
Pediatric patients with complete AV block needing ventricular pacing

- HF with myocardial dysfunction
  - Yes
  - Existing ventricular pacemaker
    - No: CPP (2b, C-LD)
    - Yes: CRT with BIV pacing (2a, C-LD)
  - Yes: Target RV mid-septal, inflow, or outflow tract transvenous endocardial site in preference to RV apical endocardial site (2a, C-LD)

- Meets criteria for transvenous ventricular pacing
  - Yes: Target RV mid-septal, inflow, or outflow tract transvenous endocardial site in preference to RV apical endocardial site (2a, C-LD)

- Meets criteria for epicardial ventricular pacing
  - Yes: Apical LV (systemic ventricle) epicardial pacing in preference to RV epicardial pacing (2a, C-LD)
Thank you for attention.