Echocardiographic Evaluation for Selection of Candidates for CRT: The validity Issue!

Sir,

Prediction of reverse remodeling in selected candidates for cardiac resynchronization therapy CRT by echocardiography has been in vogue for quite some time. Exciting data have emerged from single centre studies. Several methods have been discussed and each one predicting reverse remodeling satisfactorily. However, the methodologies employed have been questioned in recent multicentric trials. The clinical implications have far reaching effects. The feasibility of the techniques has been put to question.

**Echo Indices of Cardiac Dyssynchrony**

There are three types of cardiac dyssynchrony: 1) Atrioventricular, 2) Interventricular and 3) Intraventricular. Intraventricular dyssynchrony is the principle factor affecting contractile function and many echo parameters focus on this aspect. The echo indices and methods commonly used are:

2. The difference between Aortic – Pulmonary preejection periods (PEP).
3. Tissue Doppler imaging.
4. Strain/strain rate imaging.
5. Three dimensional (3D) echocardiography.

**Are these Methods Valid?**

Analysis of literature shows that all these methods have technical limitations due to which an ideal method is far from reality.

1. SPWMD is fraught with unsatisfactory reliability.
2. Aortic – Pulmonary PEP is reproducible but is of little clinical significance.
3. Tissue Doppler imaging may not represent true myocardial contraction but simply passive motion. Difficulty in identifying a correct peak, beat to beat variability, absence of peak during ejection period, are responsible for considerable variation in measurements.
4. Strain rate imaging was supposed to differentiate active myocardial contraction from passive translational movement. Conflicting data have emerged with regards to predicting reverse remodeling response.
5. The advantage of comparison of LV segments in the same cardiac cycle makes 3D echo an attractive option. However it is limited by temporal and spatial resolution and lack of data with regards to prediction of reverse remodeling.

**Guidelines**

Like the technical methods, the recommendations of guidelines too have been conflicting. While NICE guidelines recommend echocardiography in subjects with QRS duration 120-149 msec in the ECG, it stops short of addressing the methodology to measure dyssynchrony.

The ACC/AHA guidelines do not recommend echocardiography for selection of patients for CRT. The criteria include: LVEF ≤ 35%, normal sinus rhythm, NYHA class 3 or ambulatory class 4, and QRS duration > 120 msec in subjects who received optimal medical therapy.

The ASE expert consensus statement on echocardiography for CRT admits that ‘no ideal approach has yet been found’.

**Trials**

Most data have come from single-center studies. Large scale, multicentric studies are few in numbers.

- RethinQ study [n = 172]: No benefit to CRT in patients with heart failure and narrow QRS interval (< 120 msec).
- PROSPECT study [n = 498]: The authors concluded that no single echo measures of dyssynchrony may be recommended to improve patient selection for CRT. Besides all echo parameters were found to have considerable inter-observer and intra-observer variability.

**Conclusion**

As of today, there are no full-proof methods to evaluate cardiac dyssynchrony by echocardiography. Most of the indices have technical and theoretical limitations. Large scale multicentric trial data are lacking. The limited data available raise the question of reproducibility and reliability.

CRT should not be withheld from a patient who meets accepted criteria, simply because of a negative study by
echocardiography. Only large scale multicentric trials should validate its use for patient selection for CRT.

References


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