Echocardiographic Considerations for Patients with WiSE™ CRT Device

As part of SOLVE-CRT, patients undergo implantation of the WiSE™ CRT System. The WiSE™ CRT System is an implantable cardiac pacing system that provides biventricular pacing. This includes LV endocardial stimulation via an electrode that converts ultrasound energy into electrical energy for pacing. The wireless electrode is activated by an implanted ultrasound transmitter for its normal operation, but in rare instances (reportedly 3% of implants) transthoracic echo imaging has triggered extra stimulations. Extra stimulations have usually been associated with apical or near-apical electrode implants.

It is anticipated that patients will undergo planned or unplanned echocardiographic imaging in the outpatient and inpatient setting. The purpose of this document is to understand risk factors for extra stimulations, facilitate identification of extra stimulations during echo imaging, and outline an echo imaging protocol to minimize the risk of extra stimulations should they occur.

Risk Factors for Extra Stimulations:

- Apical or near apical electrode position
- Short time interval after electrode implant
- Imaging from apical views (resulting in the echo probe in very close proximity to the electrode)
- High Power Settings (as indicated in displayed Mechanical Index)
- Low Frequency ultrasound (often used for harmonic imaging)
- Thin body habitus

Safety Considerations for Patients with WiSE™-CRT Device Undergoing Echocardiography

1. If the patient has *previously had noted echo-induced ventricular arrythmia*: utilize the low power (low MI) echo imaging protocol (see below).
2. Identify the *location of the LV endocardial implant* (apical, mid, or basal ventricle). If an apical electrode is discovered, stop imaging and commence the low power (low MI) echo imaging protocol (see below) to reduce the risk of extra stimulations.
3. If *new premature ventricular contractions (PVCs) are observed* in what was previously a stable background ECG, this may represent echo-induced extra stimulations. If this occurs, stop imaging and commence the low power (low MI) echo imaging protocol (see below).
4. Use of *CW Doppler should be minimized* and do not directly focus the CW ultrasound beam on the electrode. Know the location of the LV endocardial implant prior to any use of CW Doppler

Low Power (Low MI) Echocardiographic Protocol for WiSE™-CRT

Outlined below are the recommended echo procedural steps for those with an apical LV electrode implant, those with new PVCs that occur during echocardiographic imaging, or those with a history of extra stimulations on prior echocardiograms.

1. Reduce power (MI) setting to the lowest possible machine setting.
2. Increase machine power incrementally until image quality is adequate. STOP imaging and proceed to step 3 if extra stimulation is observed and image quality remains inadequate.
3. If extra stimulations occur prior to achieving adequate image quality, consider the use of an ultrasound enhancement agent with the lowest MI settings.