The International Society for Minimally Invasive Cardiothoracic Surgery

Cost-Favorable Alternative To Wireless Cardiac Resynchronization: Super-Responder Status With Posterolateral Minithoracotomy

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BACKGROUND

30-50% OF CARDIAC RESYNCHRONIZATION THERAPY (CRT) PATIENTS RECEIVE NO BENEFIT ["NON-RESPONDERS"]
European Heart Rhythm Association/ Heart Rhythm Society Guidelines

LV LEAD POSITION IS ONE MODIFIABLE FACTOR AFFECTING CRT RESPONSE

- Coronary sinus anatomy can lead to variation in pacing site as well as access difficulty
- Typical placement in midlateral or posterolateral coronary sinus tributary

Spragg et al., J Am Coll Cardiol 2010;56:774-81

Optimal Left Ventricular Endocardial Pacing Sites for Cardiac Resynchronization Therapy in Patients With Ischemic Cardiomyopathy

- Extreme basal LV wall was an optimal site in each patient
- Standard mid-LV free wall site was optimal in only 27%

WIRELESS LV ENDOCARDIAL LEAD SYSTEM

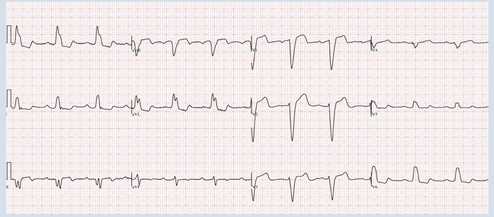
- 2-stage procedure: chest wall and transaortic approach
- 1/2022: SOLVE-CRT 6-month phase I trial (n=29)
  41% had increase in EF ≥ 5%
  35% had decrease in LVED Volume ≥ 10%
  47% had ≥ 1 increase in NYHA Class
- Device cost: ? US FDA status: not yet approved

We chose an alternative surgical approach to epicardial lead placement in a patient that facilitated cost-effective achievement of CRT super-responder [ejection fraction > 50%] status.

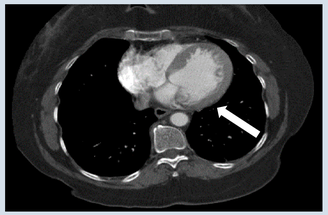
INDEX PATIENT

70 yo woman – NEEDING LV EPICARDIAL LEAD INSERTION

- Nonischemic dilated cardiomyopathy
- NYHA Class III function and dyspnea
- Left bundle branch block with QRS 185 msec
- LV ejection fraction 30%
- 7 left heel operations with ambulation limitation
- Unsuccessful coronary sinus lead insertion for biventricular ICD



CT SCAN: POSTEROLATERAL APPROACH ABLE TO PROVIDE DIRECT ACCESS TO THE BASAL OBTUSE MARGIN REGION



SURGICAL APPROACH

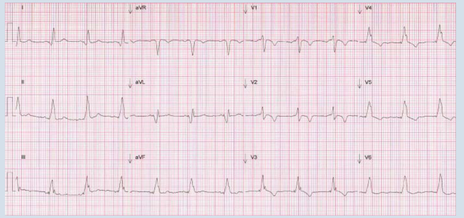
- Full lateral decubitus position; double-lumen endotracheal tube
- Left arm independent draping allowed entire left chest access
- 3-inch, 6th interspace posterolateral minithoracotomy
- Small wound protector; no rib spreading
- Pericardium overlying basal mid-lateral obtuse margin was located immediately below incision, posterior to phrenic nerve
- Unipolar, screw-in electrode attached without specialized instrumentation (24.4 mV R-wave, 0.8 V initial threshold)
- Same skin prep: tunneled to (upgraded) pulse generator pocket

EQUIPMENT COST: Lead ($200) + CRT-ICD generator ($9077)

RESULTS

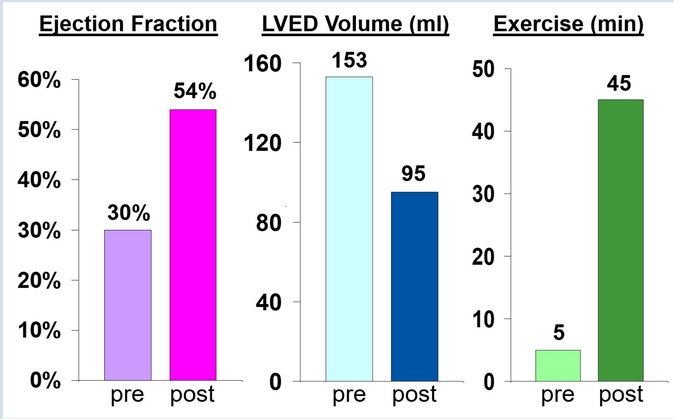
POSTOPERATIVE COURSE AND 1-YEAR FOLLOW-UP

- POD 3: Discharged home, walking without incisional pain
- Cardiac rehab: recumbent step exercise
- Pacer interrogation: 90% LV pacing with 0.5 V threshold (now 95%)
- V1 QRS 160 msec; morphology change





ECHO: LV LEAD



CONCLUSIONS

Non rib-spreading, single skin-prep posterolateral minithoracotomy in our patient:

a) permitted torque-free epicardial LV lead localization at the basal mid-lateral obtuse margin site deemed favorable in LV endocardial CRT pacing scenarios

b) achieved a 24 percentage-point increase in LV ejection fraction, a 38% decrease in LV end-diastolic volume, and durable NYHA Class improvement at 1 year at likely a fraction of the cost of wireless LV endocardial lead systems.