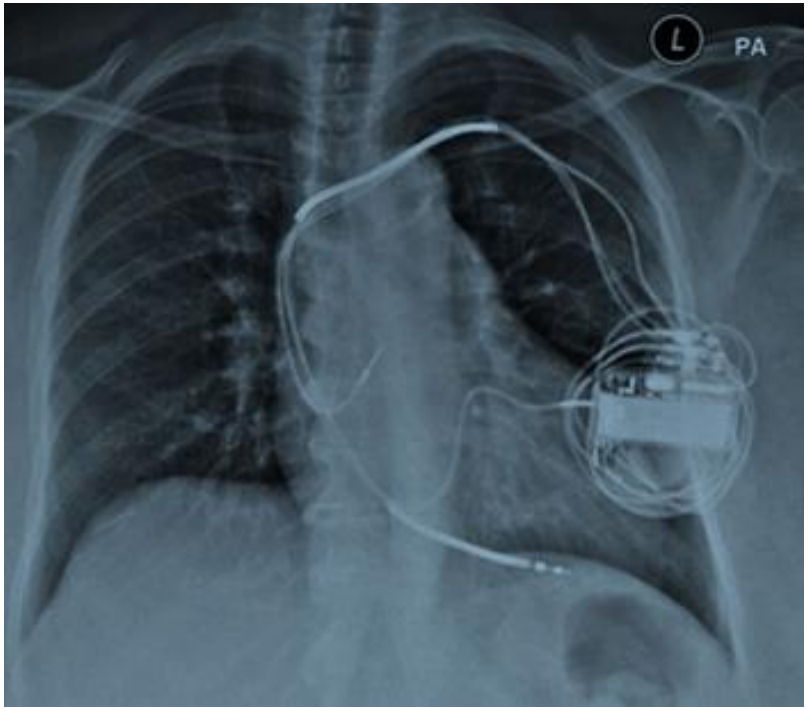
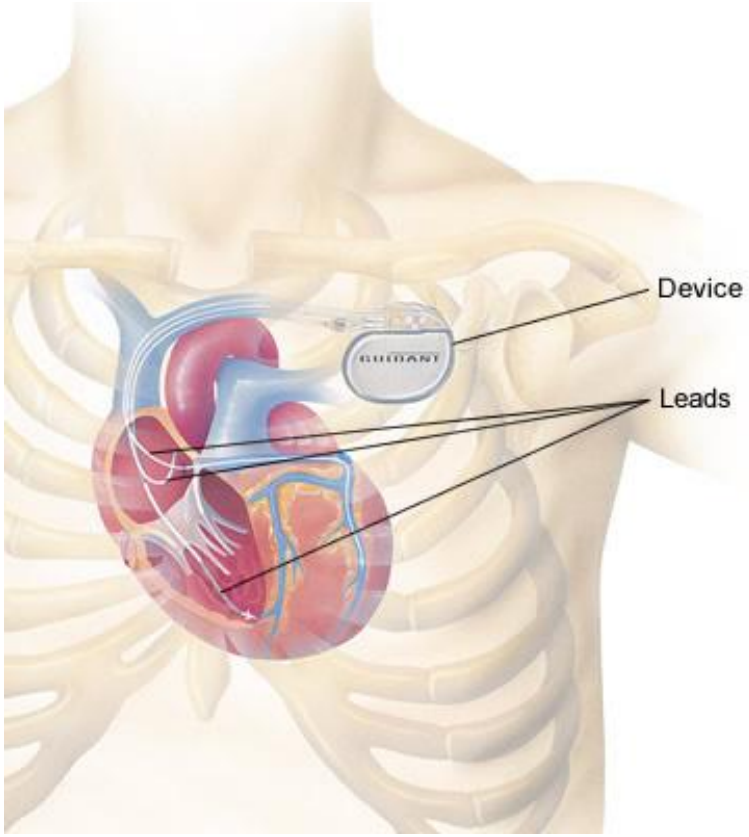
NImedical

Cardiac Resynchronization Therapy and Defibrillator (CRT-D) Optimization By using the NICaS (Non Invasive Cardiac System)

Cardiac Resynchronization Therapy





Right Atrium lead

Right Ventricle lead → **AV Delay calibration**

Left Ventricle lead → **VV Offset calibration**

Current CRT Optimization Challenges

- **CRT is an important non-pharmacologic advancement in the treatment of patients with heart failure (HF). A number of studies have suggested that optimization of paced/sensed atrio-ventricular (AV) and interventricular (VV) timings may reduce the rate of CRT non-response.**
- **Recent studies have shown that paced/sensed AV and VV delays change over time[1,2] and re-optimization of these delays might be beneficial for maintaining improvement of cardiac function.**
- **Today CRT optimization is done by using CO reading taken by Echo Doppler.**
- **CO measurement by using Echo Doppler is complicated, time consuming, operator dependent and expensive.**
- **As a result, in most cases, electro physiologists do not optimize CRT and remain with manufacturer's presetting.**
- **NICaS provide an accurate and easy continuous CO measurement enable easy CRT optimization that allows effective treatment of HF.**

1 O'Donnell, et al. "Long-Term Variations in Optimal Programming of Cardiac Resynchronization Therapy Devices" PACE: Vol 28 Supp S24-S26 (Jan 2005).
2Porciani et al. "Temporal Variation in Optimal Atrioventricular and Interventricular Delay During Cardiac Resynchronization

CRT Optimization by Using NICaS

1. **Connect patient to Right Wrist and Left Ankle. Make sure that the patient is laying down and reading is stable.**
   - The right wrist – left ankle connection will minimize CRT noises as the CRT is implanted on the left side on the thorax
2. **Start with AV delay calibration:**
   - Set AV Delay to 100, 120, 140, 150 mSec.
   - At each setting allow NICaS to measure for 2 min
3. **Set AV delay at maximum CO point**
4. **Once AV delay is set start optimize VV Offset**
   - Set VV offset to -60, -40, -20, 0, +20, +40, +60 msec.
   - At each setting allow NICaS to measure for 2 min
5. **Set VV Offset and AV delay at maximum CO point**

Please note that it is very important that the patient will not move and talk during the optimization and that HR will maintain constant

Example of CRT Optimization by NICaS

SN	Date	SBP	DBP	HR	SV	CO	CI	CPI	GGI	TPR	TBW%
010	02-Jul-12	140	80	63	61.2	3.9	2.3	0.52	10.6	2064	41.9
	AV delay 100; LV offset -60										
009	02-Jul-12	140	80	63	54.9	3.5	2.1	0.46	9.4	2310	41.9
	AV delay 120; LV offset -60										
008	02-Jul-12	140	80	63	54.7	3.4	2.1	0.46	9.2	2325	41.9
	AV delay 150; LV offset -60										
007	02-Jul-12	140	80	62	50.3	3.1	1.9	0.42	8.1	2576	42.9
	AV delay 150; LV offset +20										
006	02-Jul-12	140	80	64	48.0	3.1	1.9	0.41	7.9	2613	44.6
	AV delay 150; LV offset +20										
005	02-Jul-12	140	80	63	48.5	3.1	1.8	0.41	7.8	2613	45.1
	AV delay 150; LV offset -40										
004	02-Jul-12	140	80	62	50.5	3.2	1.9	0.42	8.2	2540	44.6
	AV delay 140; LV offset -80										
003	02-Jul-12	140	80	63	57.5	3.7	2.2	0.49	9.5	2207	43.5
	AV delay 150; LV offset -60										
002	02-Jul-12	140	80	63	55.6	3.5	2.1	0.47	9.0	2294	44.5
	AV delay 150; LV offset -20										
001	02-Jul-12	140	80	63	55.4	3.5	2.1	0.47	9.6	2277	43.7
	AV delay 150; LV offset 0										

Optimized setting
AV delay – 100
LV offset - -60

Initial setting
AV delay – 150
LV offset - 0