

# Echocardiography identifies responders to cardiac resynchronization therapy

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## Rationale

Cardiac resynchronization therapy (CRT) has been proven to be effective in ameliorating the clinical and functional status of patients with CHF and left ventricular asynchrony patterns. Nonetheless, it is still unclear if baseline variables (clinical and/or instrumental) may identify responders (R) to CRT. The aim of our study was to thoroughly analyse our database of patients undergoing CRT in order to identify any variable that could predict a positive response to CRT.

## Methods

55 consecutive patients with CHF of any etiology underwent CRT.

At echocardiography, interventricular and intraventricular delay were defined as follows:

- Interventricular (Inter VD) delay as an electromechanical delay > 20 msec
- Intraventricular (Intra VD) delay as Q- end of lateral wall contraction (Q- LW) > Q- mitral E wave (Q-E) and/or Q-LW > 290 ms (normalized for 70 bpm)

The patients were divided in two groups, R and NR considering clinical and functional parameters:

R demonstrated at follow-up:

- Improvement of at least 1 NYHA class
- Improvement of EF and 6MWT of 20% from baseline
- No further hospital admissions for CHF
- No cardiovascular death

## Enrolment criteria

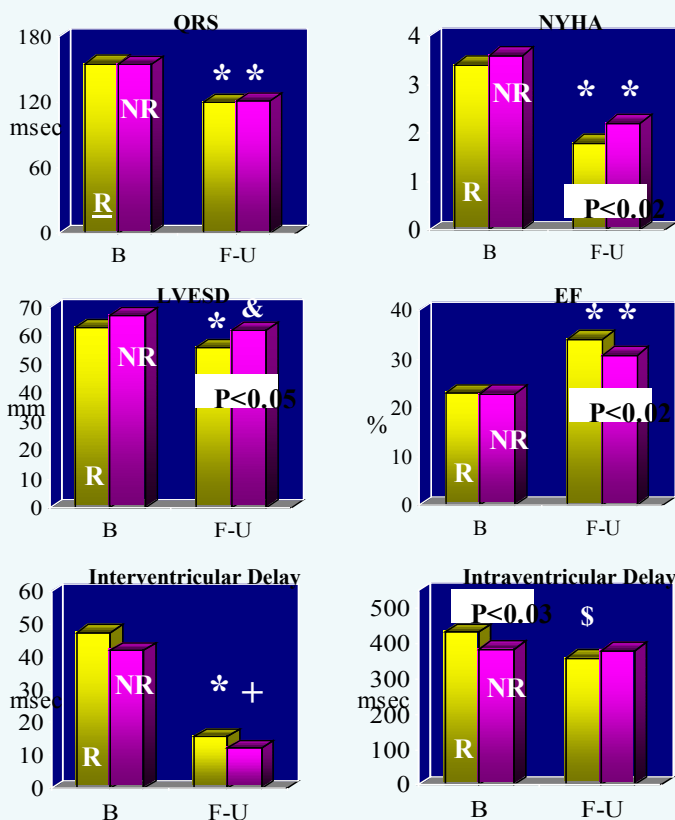
- NYHA III-IV despite optimal medical therapy
- LVEF ≤ 35%
- Inter- and intraventricular delay at echocardiography, *independently from QRS duration*

## Procedures

- Clinical evaluation
- 6MWT
- Echo exam at baseline, after implantation, after 1 and 3 months and every 6 months

## Results

After a mean follow-up of 189 ± 120 days 41 patients (74,5%) were R and 14 (25,5%) NR to CRT



QRS baseline	155,3 ± 30	154,3 ± 38,4	NS
QRS F-U	120,6 ± 20,2	121,4 ± 20,3	NS
CAD %	36,6	42,8	NS
No CAD %	63,4	57,2	NS
NYHA IV	16 (39%)	9 (64,3%)	NS
NYHA III	25 (61%)	5 (35,7%)	NS
NYHA (baseline)	3,39 ± 1,5	3,64 ± 1,5	NS
NYHA (F-U)	1,81 ± 1,5	2,2 ± 1,6	<0,02
EF (baseline)	23 ± 4	22,9 ± 4	NS
EF (F-U)	34 ± 4	30,8 ± 5	<0,02
LVEDD (baseline)	75 ± 6	78,1 ± 2,4	NS
LVEDD (F-U)	68,7 ± 10	66,9 ± 2,8	NS
LVESD (baseline)	63 ± 6	66,9 ± 2,8	NS
LVESD (F-U)	56 ± 10	62 ± 1,9	<0,05
Inter VD (baseline)	47,6 ± 7,2	42,1 ± 7,1	NS
Inter VD (F-U)	15,8 ± 5,2	12,1 ± 2,1	NS
Q-LW (baseline)	431,3 ± 9,3	358,9 ± 10,9	<0,03
Q-LW (F-U)	383,7 ± 2,3	380,7 ± 3,5	NS
MR area (baseline)	7,9 ± 4	7 ± 6	NS
MR area (F-U)	5,1 ± 6	4,5 ± 5	NS
VTI aortic (baseline)	18,4 ± 4	21,3 ± 2	NS
VTI aortic (F-U)	19,6 ± 2	23,7 ± 2,3	NS
6MWT (baseline)	249,6 ± 3,4	239,4 ± 2,9	NS
6MWT (F-U)	385,2 ± 2,5	359,2 ± 3,5	NS

Tab. 1 – Comparison between clinical and instrumental data between Rand NR

## Conclusions

74,5% of our patients were R to CRT, with a statistically significant improvement of NYHA class, EF e LVESD with respect to NR.

NR did not show any improvement of intraventricular delay after CRT.

**The only baseline parameter that identified R to CRT was Q-LW.**

*CRT may be most effective in the presence of a high degree of intraventricular asynchrony. The indication for CRT should be based on the presence of inter- and intraventricular delay at echocardiography and not on QRS duration.*