Heart rate variability and efficacy of the enalapril maleate therapy of chronic heart failure patients

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Enalapril maleate (EM) - ACE inhibitor, one of the drugs of the first line therapy for the patients with a chronic heart failure (HF)

The proved effects of EM at HF:

- Increase the quality of life
- Increase the life-span
- Decrease the frequency of hospitalization
- Decrease the frequency HF progression
- Decrease the blood pressure
Heart rate variability (HRV)

- Non-invasive tool for assessment of the state of neurohumoral regulation
- Independent predictor of the sudden death and bed outcomes
Object of the study

• 47 patients HF II-III FC on NYHA
• HF was caused by a combination moderate to severe arterial hypertension and angina pectoris FC II on Canadian classification
• Mean age 64,2+6,8 years
• Male -16, female - 31
Stages of the study

Assessing of neurohumoral regulation with HRV method ⇒ acute farm test: 10-20 mg of enalapril maleat ⇒ assessing neurohumoral regulation after 180 minutes ⇒ 1 month of the treatment with enalapril maleat (15 - 25 mg/day) ⇒ assessing of neurohumoral regulation and clinical effects
Heart rate variability method

Spectral characteristics as neurohumoral regulation indexes:

1. TP (msek²) – common neurohumoral regulation
2. VLF (msek²) – mostly humoral activity
3. LF (msek²) - mostly sympathetic activity
4. HF (msek²) – mostly parasympathetic activity
Stratification of patients

Acute farm test with EM

Two groups:

Group 1:
Increase of TP
24 patients

Group 2:
Decrease of TP
23 patients
Results of treatment: blood pressure and heart rate

Group 1

- **Basic stage**
- **After farm test**
- **After 1 month of therapy**

Group 2
Dynamic of heart failure clinic appearance in the groups

After 1 month of the therapy

Before the starting of the therapy
HRV changes in 1 month therapy with EM

Group 1

Group 2

Basic stage

After therapy
Patient T., female, (group 1), 66 y.o.
Basic stage of HRV
Patient T., female, (group 1), 66 y.o. HRV after acute farm test with EM
Patient T., female, (group 1), 66 y.o.
HRV after 1 month of EM therapy
Patient M., female, (group 2), 64 y.o.  
Basic stage of HRV
Patient M., female, (group 2), 64 y.o.
HRV after acute farm test with EM
Patient M., female, (group 2), 64 y.o.
HRV after 1 month of EM therapy

- mRR: 700 ms
- sdRR: 25.05 ms
- SD: 0.00 ms
- SDANN: 0.00 ms
- rMSSD: 10.17 ms
- pNN50: 0%
- HRV T1: 4.70
- Total power: 441 ms²
- VLF: 271 ms²
- LF: 135 ms²
- LF norm: 80%
- HF: 35 ms²
- HF norm: 21%
- LF/HF: 3.8
- K kant: 0.91
Conclusion:
The results have shown, that the efficiency of HF therapy by the EM is appreciably determined by initial reaction TP HRV on a preparation in acute pharmacological trial.

In the group of the patients with increase of TP in acute farm test with EM the therapy within one month results in rising capacity NGR.

At the patients with decrease of TP in acute farm test with EM capacity after 1 month of therapy falls with intensifying of sympathetic influences.

The research shows necessity of the individual approach to treatment HF.