Role of basic neurogumoral regulation state in enalapril malelat treatment effects of hypertension patients

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ACE inhibitors are the drugs of first choice in essential hypertension.

Evidence for ACE – inhibitors using:

- Effective blood pressure control
- Prevents cardiac remodeling
- Improves outcomes
- Neurogumeral regulation modulation
- Reduce mortality and mobility
Background 2

- Clinical benefits of enalapril maleate due to its ability to influence on neuro-gumoral regulation
- Heart rate variability as non-invasive method to assess of the neurogumoral regulation state
The aim of the work was to study effects of enalapril maleat and connection with basic reactions of regulation in acute farm test.
Design of study

- 57 patients with mild to moderate essential hypertension
- Mean age $57.5\pm 7.2$
- Mean systolic blood pressure (M+/−sd) - $167.1\pm 14.9$ mm Hg
- Mean diastolic blood pressure (M+/−sd) - $99.7\pm 3.3$ mm Hg
Stages of study

Assessing of neurogumoral regulation

Acute farm test: 20 mg of enalapril

180 minutes – assessing neurogumoral regulation

1 month of treatment with enalapril maleat (30 – 40 mg/day)

Assessing of neurogumoral regulation and clinical effects
Heart rate variability method: spectral power domens analysis

Spectral characteristics

- TP (msek$^2$) – total power, reflects total level of regulation
- VLF (msek$^2$) – very low frequency power, reflects level of gumoral activity
- LF (msek$^2$) - low frequency power, reflects level of sympathetic activity
- HF (msek$^2$) – high frequency power, reflects level of parasympathetic activity

For heart rate variability analysis was used computer cardiograph – “Cardiolab-2000”
Stratification of patients

Acute farm test

1 group:
TP decrease

2 group:
TP increase

TP reaction in acute farm test

<table>
<thead>
<tr>
<th>TP, msek²</th>
<th>1 group</th>
<th>2 group</th>
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<tbody>
<tr>
<td>baseline state</td>
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Clinical characteristics of the groups

Clinical condition in 1 group is better, than in 2 group

1 – headache
2 – chest pain
3 – dyspnea
4 – rhythm disorders
5 – fluid retention
6 – Stable angina (I–III st.)
1 group - results of treatment, Blood pressure

Before               Acute farm test        One month treatment
Blood pressure, Hg mm
Systolic blood pressure
Diastolic blood pressure
2 group - results of treatment, Blood pressure

- Blood pressure, Hg mm
- Systolic blood pressure
- Diastolic blood pressure

Before treatment     Acute farm test    One month treatment
1 group - results of treatment, Heart rate variability

Before: 1 month treatment

msek2

before 1 month treatment

TP VLF LF HF
2 group - results of treatment, Heart rate variability

Before treatment:
- TP
- VLF
- LF
- HF

1 month treatment:
- TP
- VLF
- LF
- HF

msek^2
Sympathetic/parasympathetic balance

Changes of LF/HF

<table>
<thead>
<tr>
<th></th>
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<th>2 group</th>
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<tbody>
<tr>
<td>before</td>
<td></td>
<td></td>
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<tr>
<td>acute farm test</td>
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<tr>
<td>1 month treatment</td>
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LF/HF, n.u.
Patient N., 52 y.o., positive reaction on farm test

Heart rate variability before treatment and acute farm test
Patient N., 52 y.o., positive reaction on farm test

Heart rate variability after acute farm test with enalapril maleate
Patient N., 52 y.o., positive reaction on farm test

Heart rate variability after 1 month treatment with enalapril maleat
Patient K., 54 y.o., negative reaction on farm test

Heart rate variability before treatment and acute farm test
Patient K., 54 y.o., negative reaction on farm test

Heart rate variability after acute farm test with enalapril maleate
Patient K., 54 y.o., negative reaction on farm test

Heart rate variability after 1 month treatment with enalapril maleate
Comparison of treatment effects in N&K patients with positive and negative TP reaction on acute farm test
Patient N, 52 y.o
Changes in TP and sympathetic/parasympathetic balance in the treatment in

<table>
<thead>
<tr>
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<th>1 month treatment</th>
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<tbody>
<tr>
<td>TP/100</td>
<td>6.67</td>
<td>2.16</td>
<td>31.8</td>
</tr>
<tr>
<td>LF/HF</td>
<td>2.9</td>
<td>0.9</td>
<td>0.9</td>
</tr>
</tbody>
</table>
Changes in TP and sympathetic/parasympathetic balance in the treatment in patients K, 54 y.o.

Before treatment: TP/100 = 6.94, LF/HF = 2.95

Acute farm test: TP/100 = 2.95, LF/HF = 1.9

1 month treatment: TP/100 = 4.4, LF/HF = 2.11
Patients with hypertension can be divided into two groups with positive and negative TP reaction on EM acute farm test

The group with positive reaction has more good clinical characteristics and more significant hypotensiv EM treatment effects

The group with negative reaction has less clinical and hypotensiv EM treatment effects

HRV changes in acute farm test can predict the treatment results in patients with essential hypertension