Clinical and Functional Dynamics of Physical Working Capacity and Psychological Adaptation in Patients with Acute Coronary Syndrome at the Stages of Rehabilitation

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Abstract
The objective of the research was to analyze the effectiveness of using suggestive therapy in the patients with acute coronary syndrome by assessing the dynamics of the clinical condition and indicators of anxiety.

Materials and Methods. There were examined 135 patients with non-ST-segment elevation myocardial infarction, 60 patients with the use of the conservative treatment and 75 patients who underwent percutaneous coronary intervention. The dynamics of objective indices, adaptation changes and anxiety indices in the groups of patients with traditional treatment and in the groups of patients with suggestive therapy in addition to the traditional rehabilitation measures, were analyzed.

Results. Analyzing the dynamics of adaptive indices, it was determined that in the group of patients with non-ST-segment elevation myocardial infarction, who were performed conservative therapy, the dynamics was less significant, which is related to the general desadaptative syndrome. Changes in the group of patients undergoing percutaneous coronary intervention and suggestive therapy, with a decrease of blood pressure, heart rate, and a decrease in the index of functional changes from 3.78±0.15 points before the intervention up to 2.92±0.13 points after suggestive therapy (p<0.01) were more significant. In all groups of patients, high levels of reactive anxiety were observed at the beginning of treatment. As a result of treatment, a decrease in anxiety was noted, but more pronounced changes were seen in the group with the use of suggestive therapy (p<0.05).

Conclusions. The use of suggestive therapy methods when treating the patients with acute coronary syndrome is an important intervention, that provides a comprehensive approach considering all the components, enhances the patients’ adaptive abilities in the rehabilitation phase, improves the quality and effectiveness of restorative treatment. The use of suggestive therapy at the rehabilitation stage improves the clinical course, reduces anginal manifestations, stabilizes blood pressure and increases exercise tolerance.

Keywords
ischemic heart disease; rehabilitation; adaptation; psychology; anxiety

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Problem statement and analysis of the latest research
Desadaptative strategies as for the behavior of patients which develop on the background of a chronic disease such a coronary heart disease (CHD) can significantly reduce patients’ attitude toward the favour to treatment and fulfillment of the medical prescriptions, that further exacerbates the course of the disease.
The destabilization of a chronic disease, cardio-
genic life-threatening conditions associated with 
a vital threat, alter the system of personality atti-
tude thereby worsening mental adaptation under 
new conditions. Such changes may manifest them-
sevles in the form of non-implementation of medi-
cal recommendations, anxiety-depressive disorders, 
worsening of the clinical condition [1].

Mental adaptation is considered as a systemic 
process that involves the reorganization of the sys-
tem of personal relation in order to achieve a bal-
cance between the necessity of the personality and 
the new conditions of life. Mental adaptation under 
the conditions of the disease combines the emo-
tional and the behavioral components. These com-
ponents are independent ones; the emotional aspect 
is predominantly internal, subjective, and the be-
havioral one is external, objective (as the degree of 
conformity of behavior to a particular image) [2].

The achievement of the positive dynamics in 
treatment of the patients with CHD is possible in 
close collaboration with the attending physician, re-
habilitation physician, psychologist and the patient 
himself. The criterion for the effectiveness of co-
operation is the patients’ favour to the treatment; 
its provision is possible if the level of situational 
and personal anxiety decreases, and the competence 
in the nature of the disease, causal relationships of 
behavior and symptom, the potential prospects of re-
covery, etc. increases. Therefore, it is important to 
develop additional measures to reduce anxiety and 
increase the patients’ competence in the scope of 
their own health, which would be an effective factor 
of the improvement of the quality and effectiveness 
of restorative treatment [3, 4, 5].

Suggestive therapy is the method of achieve-
ment of a state of comfortable relaxation by the 
patient, which helps reduce the level of situational 
and personal anxiety, congruent self-perception, ill-
ness and current state of health [6, 7].

Musical accompaniment is used to increase sug-
gestion efficiency. The mechanism of music ac-
tion onto the cardiovascular system is the creation 
of an appropriate psycho-emotional background 
and influence through the autonomic nervous sys-
tem. Calm, slow-paced music enhances the tone of 
the parasympathetic compartment, which slows the 
heart rate (HR) and lowers blood pressure (BP). The 
use of music therapy reduces the severity of anxiety 
and improves the quality of sleep. The study of the 
fluence of music on the course of stress showed 
that the levels of biochemical markers of stress (no-
radrenaline, adrenocorticotropic hormone, cortisol, 
leptin, carbon dioxide) reduce simultaneously with 
the restoration of a positive emotional state against 
the background of music intervention, and daily 
listening to the positive music significantly lessens 
the influence of chronic stress [8, 9, 10].

The objective indices of the condition of the car-
diovascular system are BP and HR. These indices 
can be considered as adaptation to changes in the 
disease, as well as a criterion for the effectiveness 

The objective of the research was to analyze 
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the dynamics of the clinical condition and indices 
of anxiety.

1. Materials and Methods

There were examined 135 patients with non-ST-
segment elevation myocardial infarction (NSTEMI), 
60 patients with conservative treatment, respec-
tively, and 75 patients with invasive treatment – 
percutaneous coronary intervention (PCI). We have 
analyzed the dynamics of objective indices, adapta-
tion changes and anxiety indices in the groups of pa-
tients with traditional treatment and in the groups of 
patients where, along with traditional rehabilitation 
measures, a psychological component – suggestive 
therapy, was used. All patients received standard 
therapy for CHD, depending on the form of CHD 
and in accordance with the recommendations of the 
Working Groups of the European and Ukrainian 
Societies.

The use of suggestive therapy was performed 
in the departments of the Regional Clinical Center 
of Cardiology. Classes were held every day (the 
number of lessons was 21); lessons were held in 
the wards of the department, from 3 to 9 people 
participated in each class; duration of the lesson
was 20 minutes; during the class, the data were recorded in a developed observation form.

There was evaluated the clinical course on the basis of complaints, subjective and objective indices. HR, BP and the index of functional changes (IFC) were determined before the performance of suggestive therapy and after the intervention. The adaptation potential (AP) was analyzed according to the quantitative index (RM Baievskyi, AP Berseneva) such as the IFC or the level of adaptation, which allows evaluating the adaptive reactions of the organism as a manifestation of different stages of general adaptation syndrome [12, 13].

\[
AP(\text{points}) = 0.011 \times (HR) + 0.014 \times (SBP) + 0.008 \times (DBP) + 0.014 \times (age, \text{years}) + 0.009 \times (bodyweight, \text{kg}) - 0.009 \times (height, \text{cm}) - 0.27.
\]

Anxiety level was assessed by the following questionnaires - the Spielberg-Hanin Situational and Personal Anxiety Scale and the Seattle Angina Questionnaire (SAQ).

Statistical processing was performed using software “Microsoft Excel” and ”Statistica” v. 10.0 StatSoft, USA. The results were subjected to statistical processing by the methods of variational statistics (arithmetic mean value, standard error, standard deviation, confidence interval). The probability of differences between the comparison groups was determined using Student’s parametric criterion. Statistical testing of hypotheses to determine differences between nonparametric signs was performed using the \(\chi^2\)-criterion and the z-criterion. Results with \(p<0.05\) were considered statistically significant.

### 2. Results

The average age of the patients with NSTEMI who underwent conservative treatment tactics, was 68.38±1.30 years, and in the group of the patients who were performed PCI, it was 64.70±1.65 years.

Among the studied patients with NSTEMI, who were performed conservative treatment, 63.3% (38) were city residents, 36.7% were village residents; accordingly, stenting was performed in 68.0% and 32.0% of the patients.

Analyzing the dynamics of adaptation indicators according to the level of the IFC, BP, HR, it was found that in the group of the patients with NSTEMI, who were performed conservative therapy, the dynamics was less significant, due to general desadaptive syndrome, the presence of risk factors and the used treatment method (Table 1).

#### Table 1. Dynamics of adaptation indices in patients with NSTEMI who were performed conservative therapy.

<table>
<thead>
<tr>
<th>Indices</th>
<th>Before Intervention</th>
<th>After Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR, min.</td>
<td>84.3±3.32</td>
<td>76.6±3.30</td>
</tr>
<tr>
<td>SAP, mm Hg</td>
<td>150.0±3.12</td>
<td>138.6±3.10*</td>
</tr>
<tr>
<td>DAP, mm Hg</td>
<td>92.3±3.24</td>
<td>88.2±3.20</td>
</tr>
<tr>
<td>IFC, points</td>
<td>3.82±0.12</td>
<td>3.18±0.11</td>
</tr>
</tbody>
</table>

Notes: significance of difference of the indices in comparison with the values before intervention: *\(<0.05\); **\(<0.01\).

SAP – systolic arterial pressure; DAP – diastolic arterial pressure.

Analyzing the dynamics of indices of adaptation components, the decrease in BP and HR in the use of suggestive methods of therapy were determined. A decrease in the IFC was found, which indicates a decrease in the adaptation index and an improvement of the processes of adaptation of the organism (Table 2).

#### Table 2. Dynamics of adaptation indices in patients with NSTEMI who were treated using invasive tactics.

<table>
<thead>
<tr>
<th>Indices</th>
<th>Before Intervention</th>
<th>After Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>HR, min.</td>
<td>80.2±3.40</td>
<td>62.7±3.32**</td>
</tr>
<tr>
<td>SAP, mm Hg</td>
<td>148.5±3.16</td>
<td>126.6±3.14**</td>
</tr>
<tr>
<td>DAP, mm Hg</td>
<td>90.8±3.26</td>
<td>68.5±3.25</td>
</tr>
<tr>
<td>IFC, points</td>
<td>3.78±0.15</td>
<td>2.92±0.13**</td>
</tr>
</tbody>
</table>

Notes: significance of difference of the indices in comparison with the values before intervention: *\(<0.05\); **\(<0.01\).

The dynamics of reactive and personal anxiety
indices according to the Spielberg-Hanin questionnaire in the patients with NSTEMI in the application of traditional rehabilitation and in combination with suggestive therapy, was analyzed.

It was determined, that at the beginning of treatment in the patients with NSTEMI, who were performed conservative treatment, high levels of reactive anxiety were observed in all groups, in particular in the group of traditional treatment (46.8±1.20) points, in the group of suggestive therapy use – (47.2±1.19) points.

A month later, the decrease in reactive anxiety level was noted in suggestive therapy group, with no other changes observed in other groups (p>0.05). When analyzing personal anxiety as a more stable individual characteristic at the beginning of treatment, high levels were observed in all groups, (47.4±1.19) points, (48.5±1.20) points, respectively. In the group with the use of traditional methods of rehabilitation, there was no significant decrease in personal anxiety during hospital stay (p>0.05), and 6 months after treatment, the index was (45.2±1.16) points.

In the group of the patients with NSTEMI, who underwent invasive treatment tactics, high levels of both reactive and personal anxiety were noted at the beginning of treatment. As a result of treatment, there was a decrease in anxiety; however, more pronounced changes were observed in the group with the use of suggestive therapy (p<0.05). A month later, the decrease in reactive anxiety levels was observed in the group of suggestive therapy – (37.7±1.18) points; the level of personal anxiety was (42.0±1.20) points, respectively (p<0.01) (Fig. 1).

3. Discussion

In order to improve restorative treatment and the efficiency of the patients’ rehabilitation, we offer to use the method of suggestive therapy accompanied by music in traditional rehabilitation [14, 15].

Suggestion as a means of mental transformation of the patient’s condition through relaxation and mastering the self-control skills of the body provides an opportunity to change the inner picture of the patient’s world gradually, and under the managed conditions even to transform it quickly enough. Verbal suggestion involved in these transformational processes, along with other background effects of music, is particularly effective.

Figure 1. Level of reactive anxiety in the patients with NSTEMI, who underwent invasive treatment.

Suggestion acts through an audio channel, carrying certain verbal formulas aimed at accumulating and transforming the perception of information important for the patient. The content has a verbal embodiment that is repeatedly supported and duplicated by verbal formulas, inspired images, sound, ritual actions, etc. Such method of achieving a comfortable state by the patient is available and effective in a hospital setting.

During the use of the method of suggestive therapy with music accompaniment, the complex of diagnostic methods, both clinical and psychometric ones, is used; the clinical condition and objective indices (measurement of BP, HR, adaptive potential) are evaluated; psychometric indicators are tested; the psycho-emotional state, the levels of anxiety, depression, situational and personal anxiety are assessed.

The assessment of the body’s adaptive resources in the patients with CHD is a multicomponent characteristic of patient’s functional abilities. It is advisable to determine the adaptation potential in order to determine the peculiarities of the circulatory system functioning, the patient’s adaptive abilities at the stages of rehabilitation, prognosis of the disease, as
4. Conclusions

The use of suggestive therapy methods when treating the patients with acute coronary syndrome is an important intervention, that provides a comprehensive approach considering all the components, enhances the patients’ adaptive abilities in the rehabilitation phase, improves the quality and effectiveness of rehabilitation.

In the process of rehabilitation, the use of suggestive therapy improves the clinical course, reduces anginal manifestations, stabilizes BP and increases exercise tolerance.

The patients who attended classes during the rehabilitation period, had better control of their bodies and improved well-being. They were able to differentiate emotions, reported feeling of lightness, fullness of energy, sleep normalization, the decrease in the level of situational anxiety. The patients became more optimistic as for the prospects of treatment; the social climate in the ward improved; trust in a doctor and treatment process increased.

5. Prospects of Further Researches

The evaluation of adaptation peculiarities in the patients after cardiosurgical interventions with the development of rehabilitation programs is of scientific and practical interest.

References


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