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Original Research

Comparative analysis of life quality parameters of patients with a combination of stable coronary artery disease and metabolic syndrome

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Abstract

Background and aims: In recent years, the problem of comorbid course stable coronary heart disease (SCAD) and metabolic syndrome (MS) has increased significantly due to their high medical and social significance, high costs for diagnosis and treatment, reduced quality of life (QoL). The aim of the study was to conduct a comparative analysis of QoL of patients with SCAD on the background of MS in comparison to a group of patients with isolated SCAD. **Materials and methods:** The study included 52 patients with MS in combination with SCAD and 50 patients with SCAD. QoL of all patients was assessed using the general medical questionnaire – the Medical Outcomes Study 36-Item (SF-36) of a specialized questionnaire for patients with stable angina pectoris SAQ (Seattle Angina Questionnaire). **Results:** The study found a significantly lower level of QoL in patients with a comorbid course of MS and SCAD in both psychological and physical components of health (by SF-36 questionnaire) compared with patients with SCAD ($p<0.05$). According to the SAQ questionnaire, it was proved that in patients with MS in combination with SCAD the QoL was statistically significantly lower on all scales relative to the group of patients with isolated SCAD (by 8.76%) ($p<0.05$).

Keywords: metabolic syndrome, stable coronary heart disease, quality of life, SF-36 and SAQ questionnaires.

Background and aims

Metabolic syndrome (MS), or "insulin resistance syndrome", is a group of common disorders, including insulin resistance, impaired glucose tolerance, abdominal obesity, decreased levels of high-density lipoprotein, increased triglycerides, and hypertension [1–3]. The general cause of these violations is unknown. This condition is the result of a sedentary lifestyle, overeating, and as a result – obesity in the modern world. MS is associated with endothelial dysfunction and atherosclerosis, leading to an increased risk of cardiovascular disease, and type 2 diabetes [4, 5]. The main diagnosis of MS is to identify people at high risk for cardiovascular disease according to LDL-cholesterol levels. However, today there is a large proportion of MS patients who have already been diagnosed with cardiovascular disease, which requires more detailed study to improve the program of diagnosis, treatment and rehabilitation of such a cohort of patients.

In recent years, the problem of the urgency of comorbidity of therapeutic

pathologies has increased significantly due to the high tendency to general aging of the population, "rejuvenation" and an increase in the number of cases of chronic diseases, increasing the impact of negative environmental factors. It has long been known that the presence of MS increases the risk of cardiovascular disease. However, the mechanisms of influence of pathogenetic links of MS on the development and progression of stable coronary artery disease (SCAD) have not been fully studied [6]. Impaired pumping function of the heart and atherosclerotic lesions of blood vessels that provide blood circulation, lead to the development of systemic hypoxia in SCAD and contribute to fibrosis of body tissues as a whole, which further contributes to the progression of all MS criteria [7, 8].

In recent years, the study of quality of life (QoL) around the world is one of the pressing issues in medicine. According to the new concept of clinical medicine, improving the patient's QoL is either the main or additional goal of treatment. Assessment of QoL is especially important in chronic diseases that require long-term treatment, such as MS and SCAD [9]. The effectiveness of treatment and rehabilitation of patients with comorbid chronic diseases can be monitored by determining QoL. At present, more and more attention is paid to the study of the combined course of MS with cardiovascular diseases, such as SCAD [10]. The high medical and social significance of both MS and SCAD is determined by their significant contribution to the pathology of people of socially active age, high costs of diagnosis and treatment, reduced QoL, and disability. That is why the study of QoL in patients with comorbid MS and SCAD is relevant [11].

The aim of the study was to study and compare the QoL of patients with MS in combination with SCAD in comparison to patients with isolated SCAD.

Materials and methods

To achieve this aim, 102 patients with SCAD were examined. Patients were divided into two groups: the main group included 52 patients with MS in combination with SCAD; the comparison group included 50 patients with isolated SCAD. The groups were representative in terms of age, gender and duration of SCAD, socio-economic conditions. Among the patients, there were 42 (51.2%) men (average age – (49.8±5.3) years) and 40 women (48.8%) (average age – (51.6±6.7) years). The average duration of SCAD was (4.7±2.2) years. Examination of patients was carried out with their consent. All studied patients with MS had disorders of lipid metabolism and hyperglycemia. The presence of MS was determined according to the guidelines of the National Heart, Lung and Blood Institute (NHLBI) and the American Heart Association (AHA), when at least 3 of the 5 MS criteria were diagnosed [12]. The diagnosis of SCAD was established in accordance with the 2019 ESC Guidelines for the diagnosis and management of chronic coronary syndromes. Grading of angina pectoris was established according to the Canadian Cardiovascular Society (CCS) [13, 14].

Criteria for inclusion of patients in the main group of the study were: the presence of stable angina pectoris I–II class, body mass weight (BMI) of more than 30.0 kg/m^2, the ratio of waist circumference to hip circumference (WC/HC) above 1.0 for men and 0.8 for women, hypertension and/or disorders of carbohydrate metabolism. The study did not include patients with unstable angina pectoris with grading class III–IV, severe diabetes mellitus requiring insulin, oncology, cardiovascular and somatic diseases in the stage of decompensation. The research meets the requirements of the Helsinki Declaration of the World Medical Association "Ethical principles of medical research with human involvement as an object of study" by the decision of the Committee on Bioethics of I.Horbachevsky Ternopil State Medical University of Health Ministry of Ukraine No 21/2017.

Standardized general and specific questionnaires were used to assess QoL. General questionnaires are used for any pathological condition and allow you to compare QoL in different diseases, but not to assess specific aspects of a particular pathology. Specific questionnaires are insensitive in assessing the impact of comorbidities. Therefore, for the reliability of the results, we used both specific and non-specific questionnaires.

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Patients were evaluated using a general questionnaire – the Medical Outcomes Study 36-Item (MOS SF-36), in which 36 items were grouped into 8 scales. Indicators of each scale vary between 0 and 100 points, where 100 points – complete health. All scales form two indicators: mental and physical health. The following indicators were quantified:

- Physical functioning – a scale that assesses how the physical condition limits physical activity (walking, climbing stairs);
- Physical role functioning – the influence of physical condition on daily activities (work, daily responsibilities);
- Bodily pain – a scale of pain intensity;
- General health perceptions – assessment of the patient's health at the moment and treatment prospects;
- Vitality – the scale of vitality;
- Social functioning perceptions – a scale of social functioning;
- Emotional role functioning – a scale that shows the emotional state; the scale makes it possible to assess how the emotional state interferes with the performance of work or other daily activities;
- Mental health – a scale that characterizes the mood, the presence of depression, anxiety, a general indicator of positive emotions.

The physical component of health is represented by scales from 1 to 4, and the psychological component – from 5 to 8.

The Seattle Angina Questionnaire (SAQ) was used to assess the severity of symptoms of angina pectoris and QoL. It consists of 19 questions about the patient's condition, which form 5 scales that assess the most important aspects of SCAD: PL (Physical Limitation) – restriction of physical activity, AS (Anginal Stability) – stability of angina, AF (Anginal Frequency) – frequency of attacks, TS (Treatment Satisfaction) – satisfaction with treatment, DP (Disease Perception) – attitude to the disease. The results of QoL are expressed as a percentage: 0–24% correspond to a very low QoL in a patient with SCAD, 25–49% – moderately reduced, 50–74% – slightly reduced, 75–100% – good or excellent [15].

Statistical analysis

Statistical processing of the obtained research data was processed using the software Excel ("Microsoft", USA) and Statistica.10.1. (Statsoft, USA), by the method of variation statistics using the Mann-Whitney U-test and the Student's test. Changes at $p < 0.05$ were considered statistically significant.

Results

Evaluation of the results of the study showed that the QoL of patients in the group MS + SCAD in comparison with the group SCAD was statistically significantly lower on the scales, which assessed both the psychological and physical components of health ($p<0.05$). According to the data shown in table 1, the presence of MS significantly worsened the QoL of patients with SIHS on all scales that reflect the patient's physical condition, such as – physical activity, physical role functioning, bodily pain intensity, general health perception, vitality.

Among patients with MS + SCAD the low rates were observed on the scales of psychological

Table 1: Comparative analysis of quality of life on the scales of the questionnaire SF-36 (in points) (M±m).

SF-36 questionnaire scale	Comparison group	
	SCAD (n=50)	MS+SCAD (n=52)
Physical functioning	49.6±0.9	35.4±0.9*
Role physical functioning	52.5±0.8	42.5±0.8*
Pain	35.6±0.8	40.9±1.0*
General health	48.1±0.6	43.1±0.8*
Life activity	56.5±0.7	46.5±0.8*
Social functioning	57.9±0.7	46.2±1.0*
Role emotional functioning	66.3±0.9	53.8±0.9*
Mental health	68.9±0.8	55.7±0.8*

Note: *The significance of the difference in the MS+SCAD group compared to the SCAD group ($p<0.05$).

health. This indicates that the daily activities of the patient were not limited to the clinical manifestations of these diseases, but also accompanied by negative emotional coloration, a sharp decline in strength and energy, lack of motivation and sufficient physical potential for adequate daily work, associated with the simultaneous presence of two existing diseases. The total score on the SF-36 questionnaire in patients with MS + SIHS was (45.5±0.8) points, and in patients with isolated SCAD (54.4±0.8) points ($p < 0.05$).

The data of the comparative analysis of the parameters of QoL of patients of the Seattle questionnaire (SAQ) study groups presented in the diagram allow us to state that the QoL of patients with SCAD on the background of MS was statistically significantly reduced on all scales of the SAQ questionnaire ($p<0.05$). This proved that the presence of MS should be considered a major factor in QoL reduction in patients with SCAD. Thus, the PL scale (Physical Limitation) was 9.29% statistically significantly higher than this SCAD group, the AF scale (Attacks Frequency) – by 12.46%, the AS scale (Angina Stability) – by 22.57%, the TS scale (Treatment Satisfaction) – by 9.08% and the DP scale (Disease Perception) – by 14.15% ($p<0.05$). The total score on the SAQ questionnaire in patients with MS + SCAD was 46.76%, and in patients with isolated SCAD – 54.78% ($p<0.05$) (Figure 1).

Thus, the analysis of QoL levels of patients with SCAD by the specialized SAQ questionnaire and the general SF-36 questionnaire proved a statistically significant aggravating role of the presence of complete or incomplete MS in the course of the main pathology. Taking into account this fact motivates the optimization of treatment programs for patients with SCAD with the inclusion of drug and non-drug means of correction of MS components to achieve a higher level of QoL and prevent the progression of SCAD.

Discussion

QoL is a multi-component concept that reflects information about the main areas of human life, as well as the impact of the disease on the treatment and well-being of the patient. QoL – an integral characteristic of physical, mental, emotional, and social functioning, which changes under the influence of disease or treatment, based on subjective perception [16, 17]. QoL evaluates how the patient feels about the disease. The assessment of QoL, made by the patient, is a valuable and reliable indicator of his general condition. Improving QoL in patients with MS requires an understanding of the reasons for its reduction and evaluation of the effectiveness of therapy, in connection with which various

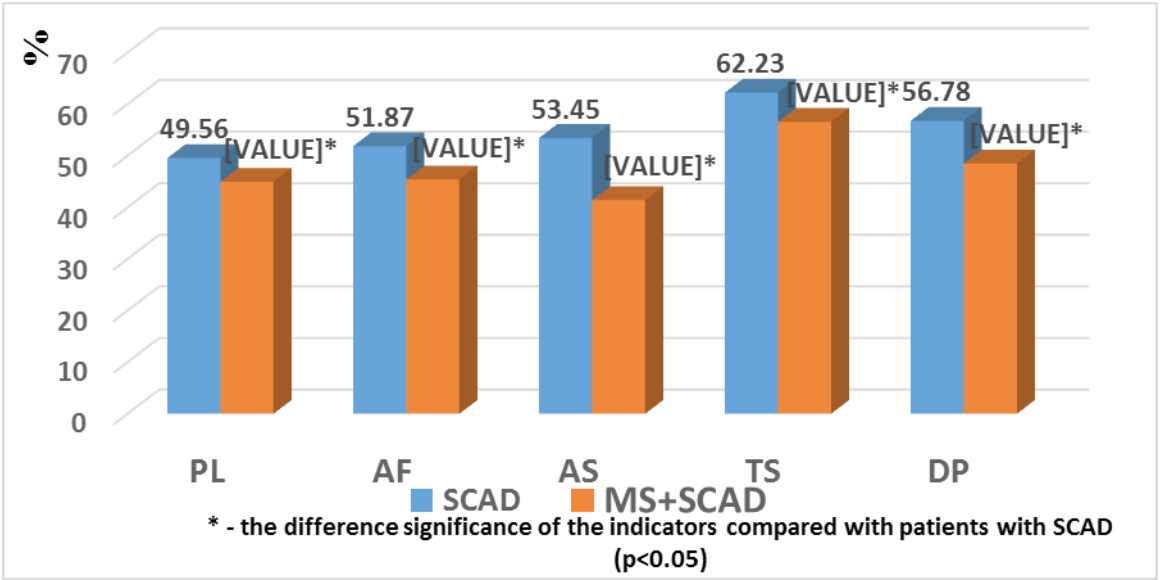

Figure 1: Comparative analysis of quality of life according to the Seattle Questionnaire (SAQ) in comparison groups (in %) (M±m).

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methods of QoL evaluation are increasingly used. As a result of clinical and psychological studies, it was found that QoL is due to health conditions. In defining this concept, an attempt was made to identify aspects of the patient's life, most dependent on the state of health, the presence of diseases and their symptoms, the effectiveness of treatment. QoL, which is due to the state of health – this is the level of human comfort both in itself and within society. The study of this allows us to determine the factors that contribute to the improvement of QoL in various diseases and, in particular, in MS [18, 19]. Patients with different combinations and numbers of components of MS have a set of disorders that affect the level of QoL.

The growing attention to the study of QoL in MS in combination with coronary heart disease led to the study of QoL in the SF-36 questionnaire, the main components of which are the physical component formed by the first four scales of the questionnaire and the mental component affected by the next four scales. When studying the indicators of the physical component of health, a statistically significant decrease in physical and role function, deterioration of general health in patients with MS with SCAD compared with a group of patients with isolated SCAD ($p<0.05$). Low scores on this scale indicate that patient's physical activity is severely limited by their health status. The higher rate corresponds to fewer limitations in life due to physical problems. Regarding the indicator of pain intensity, there was a tendency to worsen this indicator in patients with MS with SCAD compared with the group of patients with SCAD without MS. The assessment of the mental component revealed a statistically significant decrease in vitality, social function and psychological health in patients with MS and SCAD compared with the group of patients with SCAD ($p<0.05$), which is confirmed by studies by other authors [20]. Significant changes were found in the emotional component of health in MS patients in combination with SCAD compared with the SCAD group. When analyzing the data obtained, it should be borne in mind that the SF-36 questionnaire is not specific to patients with cardiac profiles and its value is influenced not only by medical but also socio-economic factors.

Changes in QoL parameters were investigated according to a specific SAQ questionnaire for patients with CHF. We found a statistically significant deterioration in QoL on the scales: PL (Physical Limitation), AS (Anginal Stability), AF (Anginal Frequency, TS (Treatment Satisfaction), DP (Disease Perception) in patients with MS with SCAD compared with the group of patients with SCAD without MS ($p<0.05$). Thus, we found that in the presence of patients with MS in combination with SCAD the QoL significantly reduced the scores on all scales of the questionnaires SF-36 and SAQ [21].

Conclusion

1. Patients with SCAD with MS had a statistically significantly lower QoL level on all scales of the non-specific SF-36 questionnaire compared to the same scales in a group with isolated SCAD (the total rate of the scales of the SF-36 questionnaire was respectively (45.5±0.8) points vs. (54.4±0.8) points ($p<0.05$)).
2. According to the specific SAQ questionnaire, the total score of all scales in patients in the MS + SCAD group relative to that in patients with isolated SCAD was significantly lower (46.76% vs. 54.78%, $p<0.05$, respectively), which proved the aggravating role of MS in SCAD and needs to be taken into account in the formation of comprehensive treatment of such patients.

Conflict of Interest

The authors declare no conflict of interest.

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