

O.S. Shchukina**CHANGING IN THE PROFILE OF A PATIENT WITH ACUTE CORONARY SYNDROME WITHOUT ST-SEGMENT ELEVATION OVER THE YEARS 2015-2020**

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Ключевые слова: острый коронарный синдром, регистр, клинические исходы

Abstract. Changing in the profile of a patient with acute coronary syndrome without ST-segment elevation over the years 2015-2020. Shchukina O.S. The article represents an analysis of the dynamics of the main demographic, clinical, laboratory, and instrumental investigations, final diagnoses of patients who were hospitalized with a diagnosis of acute coronary syndrome without ST segment elevation. A distinctive feature of the work is the recruitment of patients in the same medical institution for different periods of time, which makes possible to trace the dynamics of the clinical profile of patients in the population of Dnipro, a large industrial center of Ukraine. The prevalence of arterial hypertension, chronic heart failure and previous myocardial infarction remained at the same level. In the 2017-2020's group compared with the 2015's group, electrocardiographic manifestations of acute coronary syndrome without ST-segment elevation upon admission were more often detected. Laboratory indicators such as hemoglobin, creatinine and total cholesterol levels remained the same. Another interesting finding is a statistically significant decrease in the number of patients with a reduced glomerular filtration rate according to MDRD (less than 60 ml/min/1.73 m²) in the 2017-2020's group compared to patients in 2015's group, although the clinical course of the disease remained practically unchanged. There was a trend towards a worsening of the clinical status and prognosis, namely, increase in the prevalence of atrial fibrillation and diabetes mellitus, increase in the risk of GRACE, as well as increase in the quantity of verified diagnoses of unstable angina, which is most likely associated with the increased use of high-sensitivity troponin. Noteworthy feature is that increase in the quantity of high-risk patients led to an increase in the mean GRACE score.

Реферат. Изменение профиля пациента с острым коронарным синдромом без элевации сегмента ST за 2015-2020 годы. Щукина Е.С. В работе представлен анализ динамики основных демографических, клинических и лабораторно-инструментальных исследований, заключительные диагнозы пациентов, которые были госпитализированы с диагнозом острый коронарный синдром без элевации сегмента ST. Отличительной особенностью работы является набор пациентов в одном и том же лечебном учреждении в течение различных промежутков времени, что дает возможность проследить динамику клинического профиля больных в популяции г. Днепра крупного промышленного центра Украины. Распространенность артериальной гипертензии, хронической сердечной недостаточности и перенесенного ранее инфаркта миокарда осталась на том же уровне. В группе 2017-2020 годов в сравнении с группой 2015 года при поступлении чаще выявлялись электрокардиографические проявления острого коронарного синдрома без элевации сегмента ST. Такие лабораторные показатели, как гемоглобин, уровень креатинина и общего холестерина, остались на прежнем уровне. Другой интересной находкой является статистически значимое уменьшение количества пациентов со сниженной скоростью клубочковой фильтрации по MDRD (менее 60 мл/мин/1,73 м²) в группе 2017-2020 годов в сравнении с пациентами 2015 года, хотя клиническое течение заболевания практически не изменилось. Была выявлена тенденция к ухудшению клинического статуса и прогноза, а именно к увеличению распространения фибрилляции предсердий и сахарного диабета, увеличению риска GRACE, а также увеличению количества верифицированных диагнозов нестабильная стенокардия, что, вероятнее всего, связано с более широким использованием высокочувствительного тропонина. Следует отметить, что увеличение количества пациентов с высоким риском повлекло к увеличению среднего балла по шкале GRACE.

Coronary heart disease (CHD) is the most common cause of death of almost 2 million people in Europe annually. Pathology of coronary arteries is the cause of death of approximately 17% of men and

12% of women under the age of 65 [5]. Registers of patients with various forms of coronary heart disease are regularly kept in Ukraine and worldwide. Examples of registers for patients with acute coronary syndrome (ACS) are the European SNAPSHOT2009 and EUROASPIRE IV-V, the All-Ukrainian Register of Acute Myocardial Infarction in 2009 and the Register of Acute Coronary Syndrome in 2015. Data from international registries, in which centers from Ukraine participated, show that ACS without ST segment elevation (ACS_wST) is observed more often than with ST segment elevation, and the annual number of cases is about 3 per 1,000 population [6]. The creation of such registers also helps to assess the prevalence of comorbidities and diseases, the risk of complications and clinical outcomes.

The aim is to identify the dynamics of clinical and epidemiological indicators of patients with ACS_wST according to the infarction departments of MN PE "ECH" DCC of the city of Dnipro for 2015-2020.

MATERIALS AND METHODS OF RESEARCH

Criteria for inclusion in the research were: age over 18 years, diagnosis of ACS_wST on hospitalization and signing an agreement on data collection, which meets the ethical requirements of the Helsinki Declaration [3]. The criterion for the diagnosis of ACS_wST was the presence of 2 criteria out of 3: clinical picture of acute coronary syndrome, focal changes on the electrocardiogram (ECG) (depression of the ST segment and/or inversion of the T wave in more than two adjacent leads), elevated troponin levels [2]. Patients were divided into 2 groups: group 1 (120 patients; hospitalization in 2017-2020) and group 2 (53 consecutive patients from the Ukrainian Register of Acute Coronary Syndromes, which was conducted in March 2015). The groups of patients were similar in age and sex: in group 1 the average age was 68 [59.8; 77] years, 60 men (50%) and 60 women (50%); in group 2 – 67 [61; 75] years, 27 men (50.9%) and 26 women (49.1%).

All patients underwent standard clinical examination (history taking, objective examination), labora-

tory tests (general clinical blood test, determination of creatinine, blood glucose, troponin T, total cholesterol), risk assessment according to the GRACE scale [8] and ECG examination (recording of standard 12 leads). Troponin T was measured by enzyme-linked immunosorbent assay, normal value <0.014 ng/ml.

Statistical analysis was performed using MS Excel, Statistica 6.0 (serial number AGAR 909E415822FA). After calculating the Shapiro-Wilk test, a nonparametric distribution was found for most parameters, so nonparametric criteria were used to present and calculate the reliability of differences between groups. The median with indication of the interquartile range (25 and 75 percent) (Me [Q1; Q3]) was used to describe the quantitative parameters of the groups. The prevalence of the phenomenon in groups was described as a percentage. The significance of differences between the groups was assessed by the Mann-Whitney test (for quantitative parameters) and Pearson's χ^2 (for estimating the prevalence of the phenomenon). The results were considered statistically significant at $p < 0.05$ [1].

RESULTS AND DISCUSSION

The anamnestic characteristics of patients is presented in Table 1. The increase in the number of patients with atrial fibrillation (AF) by 3 times in group 1 compared with group 2 ($p = 0.014$) is noteworthy. Confirmation of this change is the tendency to increase of the "de novo" episode of AF at the hospital stage: in group 1 – in 6 patients (5%), and in group 2 – 1 patient (1%) ($p = 0.184$). The number of patients with type 2 diabetes mellitus (DM) in group 1 is almost 2 times higher than in group 2, but statistically this difference was insignificant ($p > 0.05$). According to the WHO, the prevalence of diabetes in Ukraine in 2016 was 9.1% [2]. That is, the indicator in group 2 was absolutely comparable with the WHO indicators, but in group 1 the prevalence of diabetes is much higher ($p < 0.001$). The prevalence of type 2 diabetes in group 1 is similar to this indicator in the SNAPSHOT 2009 register (25%) ($p > 0.05$) [4].

Table 1

The anamnestic characteristics of patients with ACS_wST

| Characteristic | Group 1 (n=120) | Group 2 (n=53) |
|--------------------------------------|--------------------|-------------------|
| Hypertension, % of patients | 103 (84.7%) | 47 (89.3%) |
| Myocardial infarction, % of patients | 37 (30.7%) | 17 (32.3%) |
| Chronic heart failure, % of patients | 59 (49%) | 24 (45.6%) |
| AF, % of patients * | 28 (23.2%) | 4 (7.6%) |
| Type II diabetes, % of patients | 25 (20.8%) | 6 (11.4%) |

Notes: significant difference between groups: * – significant difference between groups ($p = 0.014$) according to Pearson's criterion χ^2 ; in other cases, the difference between the groups is not significant.

When assessing the clinical characteristics of the groups (Table 2), it can be seen that patients in group 1 had a higher risk according to the GRACE scale [8], which provides information on mortality, overall mortality and nonfatal myocardial infarction during the first half of the ACSwST episode ($p=0.012$), which is most likely due to an increase in the proportion of high-risk ($p=0.017$) and medium-

risk patients ($p=0.04$). Both groups were similar in terms of hemodynamics and laboratory parameters ($p>0.05$). The number of patients with decreased glomerular filtration rate (GFR) ($p=0.05$) in group 1 was significantly lower than in group 2. Also in group 1 there was a tendency to increase of the severity of ECG manifestations of acute coronary syndrome.

Table 2

Clinical characteristics of groups at the time of hospitalization

| Characteristic | Group 1 (n=120) | Group 2 (n=53) |
|---|--------------------|-------------------|
| Stratification by the GRACE scale | | |
| GRACE, points * (Me [Q1; Q3]) | 135.5 [109.3;158] | 117 [105;141] |
| High risk by GRACE (≥ 141 points), % of patients ** | 55 (45.7%) | 14 (26.6%) |
| Average risk by GRACE (109-140 points), % of patients *** | 35 (29.4%) | 24 (45.6%) |
| Low risk by GRACE (8108 points), % of patients | 30 (24.9%) | 15 (28.5%) |
| Hemodynamic parameters | | |
| SAT, mm Hg (Me [Q1; Q3]) | 140 [120;152.5] | 140 [130;160] |
| DAT, mm Hg (Me [Q1; Q3]) | 80 [80;90] | 90 [80;100] |
| Heart rate, beats/min. (Me [Q1; Q3]) | 78 [70;85.3] | 80 [76;90] |
| ECG changes | | |
| Depression of the ST segment, % of patients | 73 (60.6%) | 25 (47.5%) |
| T-wave inversion, % of patients | 53 (44%) | 18 (34.2%) |
| Laboratory indicators | | |
| Hemoglobin, g/l (Me [Q1; Q3]) | 138 [125.5;147] | 139 [126;152] |
| Glucose, mM/l (Me [Q1; Q3]) | 5.4 [4.5;6.3] | 4.7 [4;5.7] |
| Creatinine, mM/l (Me [Q1; Q3]) | 97.2 [86.5;113.4] | 94.3 [86;106.9] |
| GFR, ml/min./1.73 m ² (Me [Q1; Q3]) | 62.2 [48.2;72.5] | 60.9 [48.5;74.4] |
| GFR <60 ml/min./1.73 m ² , % of patients **** | 47 (39%) | 22 (41.8%) |
| Total cholesterol, mm/l (Me [Q1; Q3]) | 4.7 [3.9;6.1] | 5.2 [4.4;6.1] |

Notes: significant difference between groups: according to the Mann-Whitney test * – $p=0.012$; by Pearson's criterion χ^2 : ** – $p=0.017$; *** – $p=0.04$; **** – $p=0.05$; in other cases, the difference between the groups is not significant.

Due to the fact that the diagnosis of acute coronary syndrome is a preliminary diagnosis, in the process of clinical and laboratory studies, patients were diagnosed with unstable angina or non-Q-myocardial infarction. The characteristics of groups of patients depending on the final diagnosis is presented in Table 3. The diagnosis of myocardial infarction was established on the basis of increased

troponin levels and clinical picture or new focal changes on the ECG in accordance with clinical protocols and treatment standards [7]. At normal troponin levels, unstable angina was diagnosed [7]. In group 1 there was a decrease in the number of patients with non-myocardial infarction ($p=0.019$), which is probably due to the wider use of diagnostic tests to determine troponin of higher sensitivity.

Table 3

Diagnosis after verification

| Final diagnosis | Group 1 (n=120) | Group 2 (n=53) |
|---|-----------------|----------------|
| Q myocardial infarction,% of patients | 6 (5%) | 1 (1.9%) |
| Not Q-myocardial infarction,% of patients * | 84 (70.2%) | 46 (87.4%) |
| Unstable angina,% of patients | 30 (24.8%) | 7 (10.7%) |

Notes: significant difference between groups: * – $p=0.019$; in other cases, the difference between the groups is not significant.

CONCLUSIONS

1. In patients of group 1, observed in 2017-2020, compared with group 2, observed in 2015, there was a tendency to increase the factors for adverse clinical course for patients with acute coronary syndrome without ST elevation: increased prevalence of atrial fibrillation and diabetes mellitus risk according to the GRACE scale.

2. The use of highly sensitive troponin allows to more reliably verify the diagnoses of myocardial infarction and unstable angina in patients with a previous diagnosis of acute coronary syndrome without ST elevation.

Conflict of interest. The authors declare no conflict of interest.

REFERENCES

1. Antomonov MY. [Mathematical processing and analysis of biomedical data]. 2017. p. 578. Russian.
2. [WHO data on diabetes in Ukraine]. [Internet]; 2016. Ukrainian. Available from: https://www.who.int/diabetes/country-profiles/ukr_ru.pdf?ua=1
3. World Medical Association Declaration of Helsinki. Ethical principles for medical research involving human subjects. Bulletin of the World Health Organization. 2001;79(4):373-374. Available from: <https://apps.who.int/iris/handle/10665/268312>
4. Parkhomenko AN, Lutai AN, Danshan N. [Ukrainian Register of Acute Myocardial Infarction as a Fragment of European: Patient Profile, Organization of Medical Care and Hospital Therapy]. *Ukrainskyi medychnyi chasopys*. 2011;1:20-24. Ukrainian.
5. Stadnik SM. [Acute coronary syndrome: thrombolytic therapy or coronary intervention?]. [Internet]. *Novyny medytsyny ta farmatsii*. 2016. Ukrainian. Available from: <http://www.mif-ua.com/archive/article/42782>
6. [Unified clinical protocol of emergency, primary, secondary (specialized), tertiary (highly specialized) medical care and medical rehabilitation. Acute coronary syndrome without ST segment elevation]. [Internet]. *Novyny medytsyny ta farmatsii*. Cardiology and rheumatology. 2016. Ukrainian. Resource access Available from: <http://www.mif-ua.com/archive/article/42776>.
7. Fourth universal definition of myocardial infarction. [Internet]. *Eur. Heart Journal*. 2018. Available from: <https://academic.oup.com/eurheartj/article/40/3/237/5079081>
8. Risk stratification in acute coronary syndrome: Evaluation of the GRACE and CRUSADE scores in the setting of a tertiary care center. [Internet]. *Int J Clin Pract*. 2019. Available from: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7027537/>

СПИСОК ЛІТЕРАТУРИ

1. Антомонов М. Ю. Математическая обработка и анализ биомедицинских данных. Київ, 2017. 578 с.
2. ВООЗ щодо захворюваності діабетом в Україні [Електронний ресурс]. 2016. URL: https://www.who.int/diabetes/country-profiles/ukr_ru.pdf?ua=1
3. Гельсінська декларація Всесвітньої медичної асоціації. Етичні принципи медичних досліджень за участю людей / *World Health Organization*, 2001. Т. 79, № 4. С. 373-374. URL: <https://apps.who.int/iris/handle/10665/268312>
4. Пархоменко А. Н., Лутай А. Н., Даншан Н. Український реєстр острого інфаркта міокарда як фрагмент Європейського: характеристика больних, організація медичної допомоги і госпитальна терапія. *Укр. медичний часопис*. 2011. № 1. С. 20-24.
5. Стадник С. М. Гострий коронарний синдром: тромболітична терапія або коронарна інтервенція? [Електронний ресурс]. *Новини медицини та фармації*. 2016. URL: <http://www.mif-ua.com/archive/article/42782>
6. Уніфікований клінічний протокол екстреної, первинної, вторинної (спеціалізованої), третинної (високоспеціалізованої) медичної допомоги та медичної реабілітації. Гострий коронарний синдром без елевції сегмента ST [Електронний ресурс]. *Новини*

медицины и фармации. *Кардиология и ревматология*. 2016. URL: <http://www.mif-ua.com/archive/article/42776>.

7. Fourth universal definition of myocardial infarction. [Электронный ресурс]. *Eur. Heart Journal*. 2018. URL: <https://academic.oup.com/eurheartj/article/40/3/237/5079081>

8. Risk stratification in acute coronary syndrome: Evaluation of the GRACE and CRUSADE scores in the setting of a tertiary care centre. [Электронный ресурс]. *Int J Clin Pract* 2019.

URL: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7027537/>

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