

Journal of
CARDIORESPIRATORY
RESEARCH



Volume 6, Issue 1

2025

МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ
РЕСПУБЛИКИ УЗБЕКИСТАН

Журнал кардиореспираторных исследований

JOURNAL OF CARDIORESPIRATORY RESEARCH

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Самаркандский государственный
медицинский университет

Tadqiqot.uz

Ежеквартальный
научно-практический
журнал

ISSN: 2181-0974

DOI: 10.26739/2181-0974



**N° 1
2025**

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СОСТОЯНИЕ КОРОНАРНОГО РУСЛА У БОЛЬНЫХ ИШЕМИЧЕСКОЙ БОЛЕЗНЬЮ СЕРДЦА

For citation: Nasyrova Zarina Akbarovna. STATE OF CORONARY VESSELS IN PATIENTS WITH ISCHEMIC HEART DISEASE. Journal of cardiorespiratory research. 2025, vol 6, issue 1, pp. ____



<http://dx.doi.org/10.26739/2181-0974/2025/6/1>

АННОТАЦИЯ

Ишемическая болезнь сердца известна как «первый убийца здоровья человека». Согласно данным, опубликованным ВОЗ в 2019 году, число людей, ежегодно умирающих от сердечно-сосудистых заболеваний, составляет 31% от общего числа смертей во всем мире, больше, чем любая другая причина смерти. **Цель исследования:** оценка степени поражения коронарных артерий у больных, направленных на экстренное и плановое аортокоронарное шунтирование. Результаты проведенного исследования показали, что из всех изученных нами факторов риска артериальная гипертензия, тревожность, гиперурикемия, гиперхолестеринемия показали взаимосвязь с количеством поражений коронарных артерий. **Материалы и методы исследования:** Исследование проводилось в рентгенохирургической операционной, оснащенной ангиокардиографической установкой "SIEMENS ARTIS ZEE ECO" (ГЕРМАНИЯ). Ангиометрические и морфометрические расчеты проводились с помощью компьютерных программ, встроенных в систему. Пунктировали артерии левого предплечья путем пункции по методу С. Сельдингера под местной анестезией (Sol. Novocaini hydrochloridi 0,25% — 20 мл). **Результаты исследования:** в результате проведенного исследования было установлено, что из всех изученных нами факторов риска артериальная гипертензия, сахарный диабет, тревожно-депрессивный синдром, бессимптомная гиперурикемия, гиперхолестеринемия показали значимую взаимосвязь с количеством поражений коронарных артерий.

Ключевые слова: коронароангиография, артериальная гипертензия, гиперурикемия, тревожность, аортокоронарное шунтирование

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YURAK ISHEMIK KASALLIGI BO'LGAN BEMORLARDA KORONAR OQIMNING HOLATI

ANNOTATSIYA

Yurak ishemik kasalligi "inson salomatligining birinchi qotili" sifatida tan olingan. JSST tomonidan 2019-yilda e'lon qilingan ma'lumotlarga ko'ra, har yili yurak-qon tomir kasalliklaridan vafot etadigan odamlar soni dunyodagi barcha o'limlarning 31 foizini

tashkil etadi, bu boshqa har qanday o'lim sababidan ko'pdir. Tadqiqotning maqsadi shoshilinch va rejali aortokoronar shuntlashga yo'naltirilgan bemorlarda koronar arteriyalarning shikastlanish darajasini baholashdan iborat. O'tkazilgan tadqiqot natijalari shuni ko'rsatdiki, biz o'rgangan barcha xavf omillaridan arterial gipertenziya, xavotir, giperurikemiya va giperxolesterinemiya koronar arteriyalarning shikastlanish soni bilan o'zaro bog'liqlikni namoyon etdi. Tadqiqot materiallari va usullari: Tadqiqot "SIEMENS ARTIS ZEE ECO" (GERMANIYA) angiokardiografik uskunasini bilan jihozlangan rentgen-jarrohlik operatsiya xonasida o'tkazildi. Angiometrik va morfometrik hisob-kitoblar tizimga o'rnatilgan kompyuter dasturlari yordamida amalga oshirildi. Chap bilak arteriyalari S.Seldinger usuli bo'yicha mahalliy og'riqsizlantirish ostida (Sol. Novocaini hydrochloridi 0,25% — 20 ml) punktsiya qilindi. Tadqiqot natijalari: o'tkazilgan tadqiqot natijasida biz o'rgangan barcha xavf omillaridan arterial gipertenziya, qandli diabet, xavotirli-depressiv sindrom, simptomsiz giperurikemiya va giperxolesterinemiya koronar arteriyalarning shikastlanish soni bilan sezilarli bog'liqlikni ko'rsatdi.

Kalit so'zlar: koronaroangiografiya, arterial gipertenziya, giperurikemiya, xavotir, aortokoronar shuntlash

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STATE OF CORONARY VESSELS IN PATIENTS WITH ISCHEMIC HEART DISEASE

ABSTRACT

Ischemic heart disease is known as the "number one killer of human health." According to data published by the WHO in 2019, the number of people dying annually from cardiovascular diseases accounts for 31% of the total number of deaths worldwide, more than any other cause of death. Purpose of the study: to assess the degree of coronary artery damage in patients referred for emergency and planned coronary artery bypass grafting. The results of the study showed that among all the risk factors we studied, arterial hypertension, anxiety, hyperuricemia, and hypercholesterolemia showed a correlation with the number of coronary artery lesions. Materials and methods of research: The study was conducted in a radiosurgical operating room equipped with an angiocardigraphic device "SIEMENS ARTIS ZEE ECO" (GERMANY). Angiometric and morphometric calculations were performed using computer programs integrated into the system. The arteries of the left forearm were punctured using the S. Seldinger method under local anesthesia (Sol. Novocaini hydrochloridi 0.25% — 20 ml). Results of the study: As a result of the conducted research, it was established that among all the risk factors we studied, arterial hypertension, diabetes mellitus, anxiety-depressive syndrome, asymptomatic hyperuricemia, and hypercholesterolemia showed significant correlations with the number of coronary artery lesions.

Keywords: coronary angiography, arterial hypertension, hyperuricemia, anxiety, coronary artery bypass grafting

Ischemic heart disease is known as the "number one killer of human health." According to data published by the WHO in 2019, the number of people dying annually from cardiovascular diseases accounts for 31% of the total number of deaths worldwide, more than any other cause of death. However, diagnosing cardiovascular diseases remains expensive, which hinders the widespread use of modern technologies worldwide, especially in some developing regions. Therefore, it is urgently necessary to find a method that allows for quick and effective diagnosis of coronary heart disease at low cost [8,9,12].

Currently, the most common method for diagnosing coronary heart disease is coronary angiography, an invasive procedure considered the "gold standard" for diagnosing coronary heart disease.

Blood biochemical analysis indicators can illustrate the degree of coronary artery obstruction [1,3,13]. After myocardial damage, cardiac troponin complexes are released into the blood, with the content of this substance in the blood gradually increasing and persisting for a long time. Therefore, when a patient presents with symptoms of cardiovascular disease, it is often necessary to perform blood tests to monitor troponin levels. Doctors can determine whether the patient suffers from heart disease and to what extent based on the test results. Thus, blood tests can be used to predict the risk of cardiovascular diseases. Additionally, color Doppler echocardiography reports are also

very useful for diagnosing coronary heart disease. This method uses the Doppler principle and various electronic technologies to display a real-time spectrogram of blood flow of a certain volume (SV) at a specific point in the heart or large blood vessels under conditions of two-dimensional echocardiogram positioning. Coronary atherosclerotic heart disease is a type of atherosclerotic lesion of the coronary arteries that causes stenosis or blockage of the vascular lumen, leading to ischemia, hypoxia, or myocardial necrosis [2,4,14].

In the aforementioned studies, most experiments used several indicators to assess the risk of coronary heart disease without taking into account the general condition of patients. The accuracy of CHD prognosis in most literature sources is below 90%, which does not meet the requirements of clinical practice. In literature using deep learning algorithms, most studies analyze coronary angiography images. Since coronary angiography has several disadvantages mentioned above, many doctors and patients are reluctant to use it. Therefore, it is urgently necessary to find a method that allows for quick, effective, and accurate diagnosis of coronary heart disease at low cost.

Purpose of the study: to assess the degree of coronary artery damage in patients referred for emergency and elective coronary artery bypass grafting.

Materials and methods: The study was conducted in a radiosurgical operating room equipped with a "SIEMENS

ARTIS ZEE ECO" (GERMANY) angiographic system. Angiometric and morphometric calculations were performed using computer programs integrated into the system. The left forearm arteries were punctured using the Seldinger technique under local anesthesia (0.25% Novocaine hydrochloride solution – 20 ml).

Data storage and primary processing were carried out in Microsoft Excel 2010 database using Statistica 10 software. The data were expressed as follows: mean value (M) $\pm$ standard deviation (m). To determine the statistical significance of differences in continuous variables between the two groups, Student's t-test was used for parametric distributions. For 3 or more groups, ANOVA test was conducted.

Results: 109 patients with coronary heart disease were selected at the Samarkand Regional Branch of the Republican Scientific and Practical Center of Cardiology. After admission to

the hospital, patients with unstable angina underwent diagnostic coronary angiography. Patients were divided into two groups based on the treatment method: the 1st group received emergency CABG (ECABG), the 2nd group received elective CABG (PCABG). To diagnose the location and severity of coronary artery (CA) lesions, we performed coronary angiography by catheterizing the femoral artery (25.2%) and radial artery (74.8%). Single-vessel disease was not detected in any patient, two-vessel disease was found in 6 (11.1%) patients of the first group and in 8 (14.5%) patients of the second group. Three-vessel disease was detected in 29 (53.7%) patients of the first group and in 26 (47.3%) patients of the second group, while lesions in more than 3 coronary arteries were found in 19 (35.2%) patients of the first group and in 21 (38.2%) patients of the second group (Fig. 1).

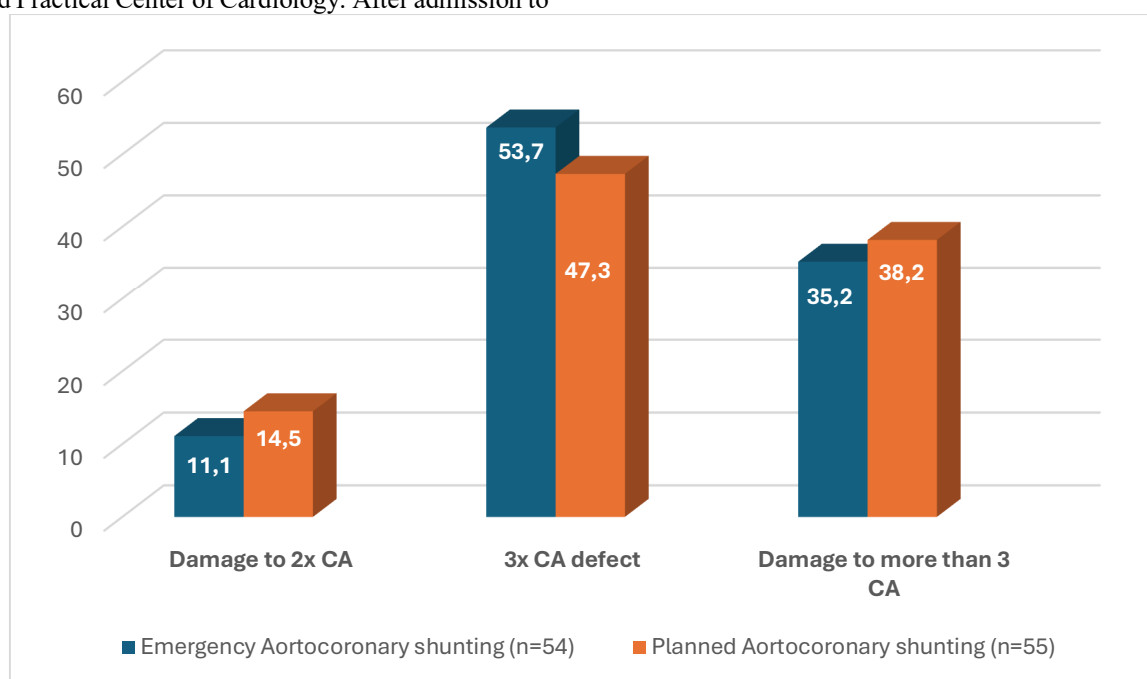


Figure 1. Distribution of patients by the number of coronary artery lesions.

Pronounced calcification was observed in 79 (72.4%) out of 109 patients

studied. In the 1st group - 41 (75.9%) patients, in the 2nd - 38 (69.1%) ($P > 0.05$ between the 1st and 2nd groups). Moderate coronary artery calcification was observed in 30 (27.6%) patients out of 109 examined. In the 1st group - 13 (24.1%) patients, in

the 2nd - 17 (30.9%). Thus, coronary artery calcification was observed in all patients, but the most pronounced calcification was registered in the 1st group of patients ($P < 0.05$), which indicates severe coronary artery damage that became an indication for EACABG.

Table 1.

CA calcification among patients with coronary heart disease who received EACABG and CABG

	Emergency Aortocoronary shunting (n=54)	Planned Aortocoronary shunting (n=55)	All patients (n=109)
Pronounced coronary artery calcification	41 (75.9%)	38 (69.1%)	79 (72.4%)
Moderate coronary artery calcification	13 (24.1%)	17 (30.9%)	30 (27.6%)
Diffuse coronary artery disease	36 (66.7%)	42 (76.4%)	78 (71.5%)
Hemodynamically significant left coronary artery disease	47 (87.03%)	49 (89.1%)	96 (88%)

Hemodynamically significant right coronary artery disease	18(33.4%)	15(27.2%)	33(30.3%)
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It should be noted that when examining the affected branches of the coronary arteries (CA) among the first group, it was revealed that the anterior interventricular artery (AIVA) was most commonly affected and was detected in 29 (53.7%) patients with unstable angina. Damage to the right coronary artery was found in 18 (33.3%) patients, while left coronary artery damage

was detected in only 8 (14.8%) patients. The diagonal branch (DB) was also frequently affected and was identified in 16 (29.6%) patients. Circumflex artery damage was observed in 12 (22.2%) patients, obtuse marginal branch damage in 10 (18.5%) patients, and posterior interventricular artery damage was detected in 4 (7.4%) patients (Fig. 2).

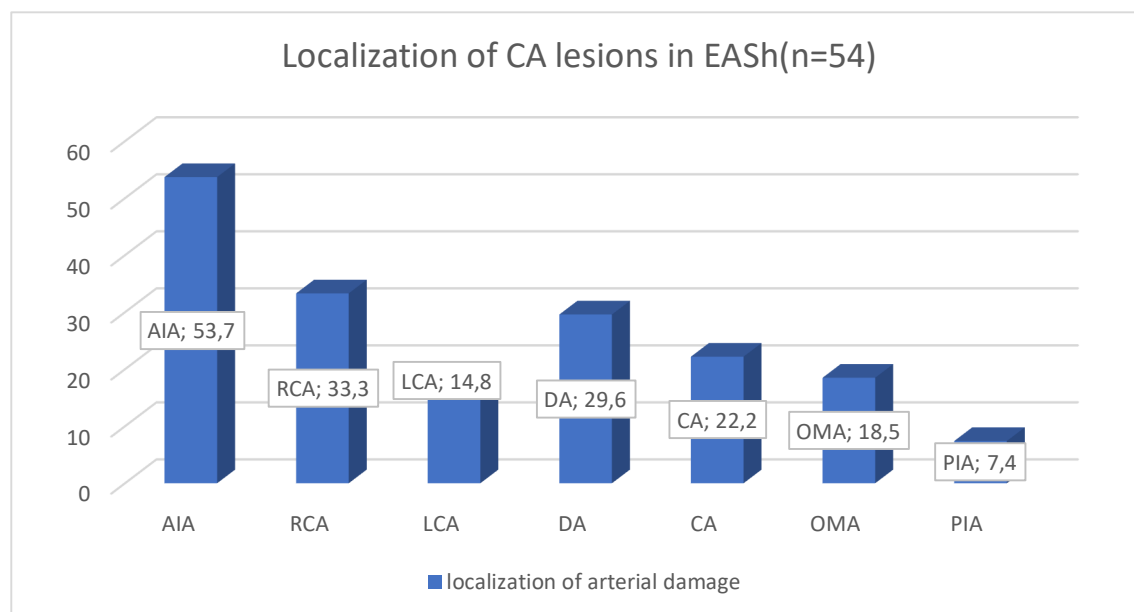


Figure 2. Localization of CA lesions in EASh.

In the study of affected coronary artery (CA) branches among the second group of patients, it was found that anterior interventricular artery (AIA) lesions were detected in 34 (61.8%) patients with unstable angina, right CA lesions were found in 15 (27.2%) patients, left CA lesions were observed in 16 (29.1%)

patients, diagonal branch lesions were identified in 18 (32.7%) patients, circumflex branch lesions were present in 17 (30.9%) patients, obtuse marginal branch lesions were found in 11 (20.0%) patients, and posterior interventricular artery lesions were detected in 12 (21.8%) patients (Fig. 2).

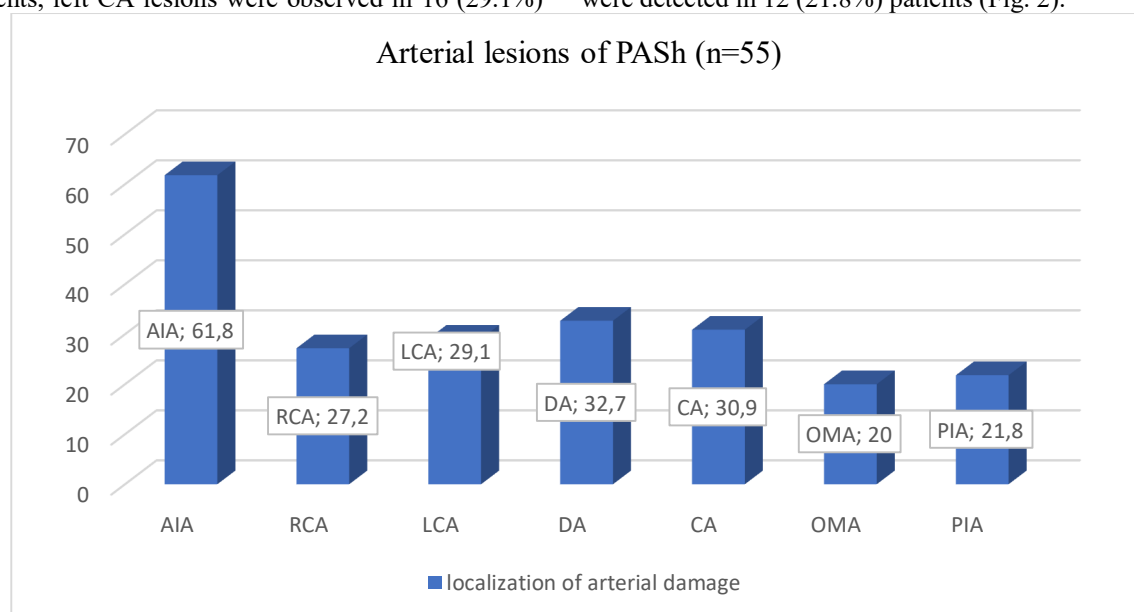


Рисунок 3. Локализации поражения КА ПАКШ.

Thus, the most vulnerable coronary arteries were the AIA, right CA, diagonal and circumflexor arteries.

To determine the relationship between CA lesions and the choice of treatment method, we decided to consider modified and

unmodified risk factors for the progression of coronary artery disease among these patients.

Table 2.

Prevalence of risk factors in groups of patients who were prescribed emergency and planned CABG

Risk factor	Emergency Aortocoronary shunting (n=54)	Planned Aortocoronary shunting (n=55)	P
Men	28 (51,8%)	28 (50,9%)	0,405
Age (years)	61,4±11,13***	63,1±10,98	<0,001
Hypercholesterolemia	41 (75,9%)	37 (67,2%)	0,241
Art. Hypertension	38 (70,4%)*	29 (52,7%)	0,022
Diabetes mellitus	14 (25,9%)	7 (12,7%)	0,411
Obesity	29 (53,7%)	23 (41,8%)	0,362
Hyperuricemia	29 (53,7%)*	21 (38,1%)	<0,001
Smoking	11 (20,3%)*	8 (14,5%)	<0,001
Heavy inheritance.	30 (55,5%)	24 (43,7%)	0,143
Low physical activity	24 (44,5%)	18 (32,7%)	0,295
Number of combined FRs	4,6±1,2***	3,2±1,5	<0,001

Note: *P<0.05, **P<0.01, ***P<0.001-significance of differences between groups of NS patients.

Table 2 presents data from a comparative analysis between patients with unstable angina (UA) who underwent endovascular aortocoronary bypass (EACB) and those who received conventional aortocoronary bypass (CACB), respectively. As can be seen, the frequency of male patients was higher among those who underwent EACB (51.8% versus 50.9%, respectively), but the difference was not statistically significant (p=0.405). Furthermore, no significant association was found between EACB and risk factors such as diabetes mellitus (p=0.41), obesity (p=0.36), family history (p=0.14), and physical inactivity (p=0.29). Statistically significant differences were identified when comparing arterial hypertension (p=0.022), total cholesterol (p<0.001), blood uric acid levels (p<0.001), smoking (p<0.001), and the frequency of multiple risk factor combinations (p>0.001). Despite the lack of statistical significance, obesity was frequently observed in patients undergoing EACB - in 53.7% of cases, although it was also common in the CACB group at 41.8%. Additionally, statistically significant indicators of hypercholesterolemia (p<0.001) and asymptomatic hyperuricemia (p<0.001) were identified, which is consistent with previous studies. The level of total cholesterol was somewhat higher in patients undergoing EACB compared to those receiving CACB, amounting to 6.9±1.88 mmol/l.

When studying the average blood pressure levels among patients undergoing EACB and CACB, the differences were not statistically significant. However, patients undergoing EACB

had higher average blood pressure levels compared to those receiving CACB: 151.2±25.12 mm Hg and 140.5±28.34 mm Hg, respectively (p>0.232).

Thus, coronary heart disease was considered a manifestation of a complex combination of 4 or more risk factors (21.8% - smoking, 47.5% - sedentary lifestyle, 71.1% - hypercholesterolemia, 53.0% - hyperuricemia, 68.8% - arterial hypertension). Isolated hypercholesterolemia alone is not capable of influencing the development of coronary heart disease, but in combination with smoking, hyperuricemia, and hypertension, it can play a negative role, triggering a cascade of pathological processes and ultimately leading to the destabilization of coronary artery disease.

To determine the relationship between risk factors and the number of affected coronary arteries, patients were divided into 3 groups (n=109): 1st group - involvement of two coronary arteries (n=14); 2nd group - involvement of three coronary arteries (n=55); 3rd group - involvement of three or more coronary arteries (n=40).

When comparing the prevalence of risk factors and the number of CA-affected individuals, a statistically significant correlation was found in the study of the frequency of arterial hypertension (AH). AH was detected in 13 (11.9%) patients of the 1st group, 19 (17.4%) patients of the 2nd group, and 35 (32.1%) patients of the 3rd group (Fig.3.3). The difference between the 1st and 2nd, 2nd and 3rd groups was statistically significant (p=0.001 and p<0.01, respectively).

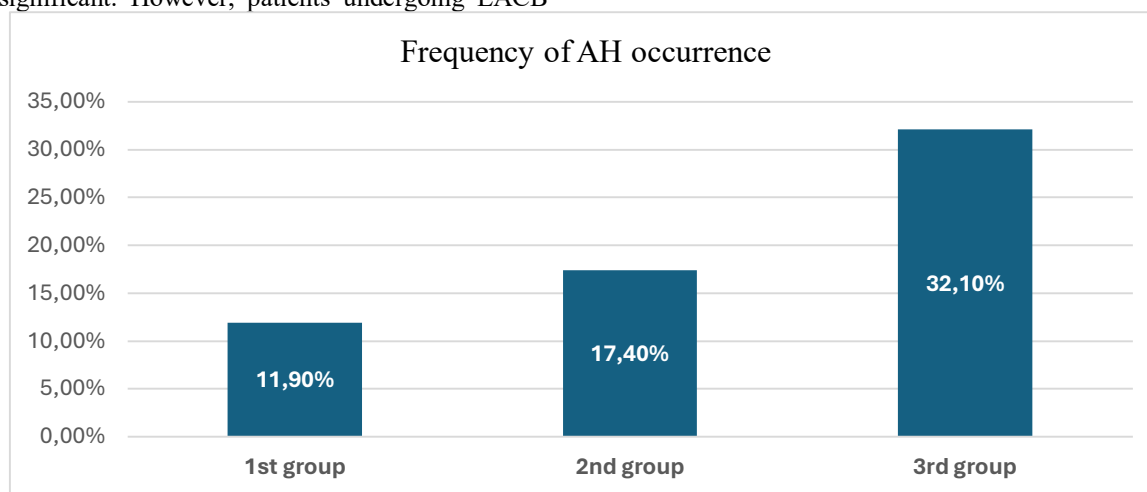


Figure 4. Frequency of AH occurrence among patients depending on the number of CA lesions.

When examining the number of CA lesions in relation to risk factors such as male sex, smoking, and low physical activity ($p>0.05$), no significant indicators were found. Unlike the aforementioned risk factors, diabetes mellitus was detected significantly more frequently in patients with multivessel

coronary artery disease (5.2%, 6.9%, and 13.3%, respectively). Additionally, when studying the prevalence of anxiety-depression syndrome among patients in the 3 groups, statistically significant results were identified, which amounted to 17.9%, 16.7%, and 45.1%, respectively (Fig. 4).

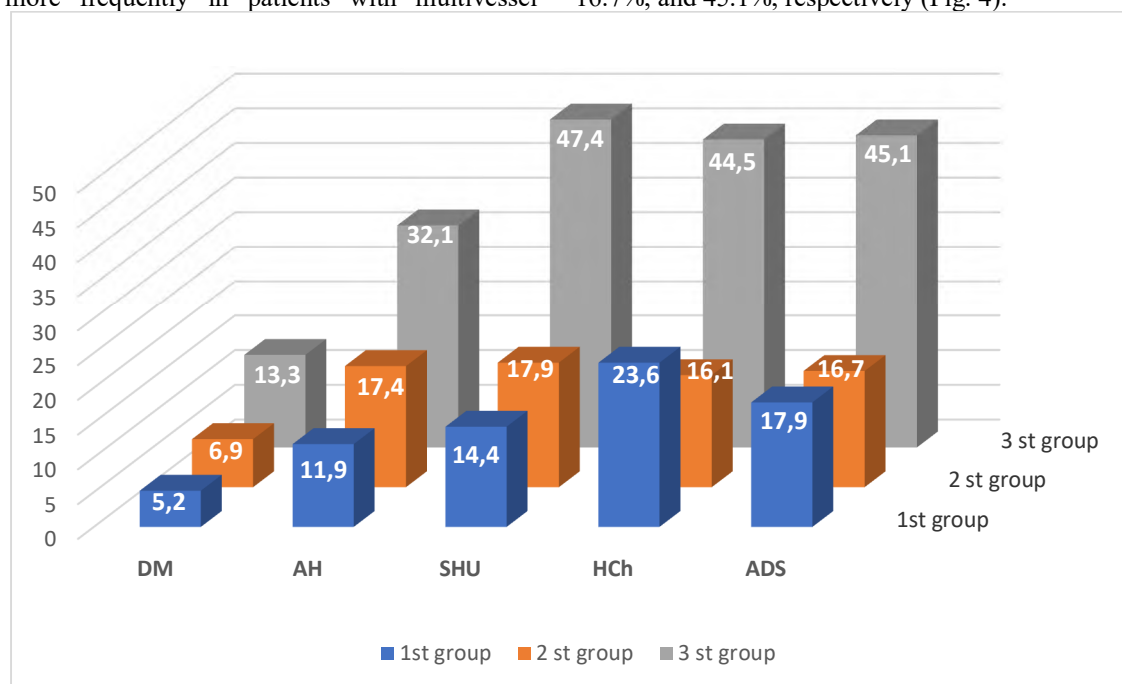


Figure 5. Frequency of occurrence of comorbid conditions depending on the number of CA lesions.

Hypercholesterolemia (HC) was detected significantly more often in patients with three-vessel coronary artery disease compared to other groups, accounting for 44.5% ($n=77$). A slight difference was observed when comparing patients of the 1st and 2nd groups (Fig. 5).

Conclusions: Thus, as a result of the conducted research, it was established that among all the risk factors we studied, arterial hypertension, diabetes mellitus, anxiety-depressive syndrome, asymptomatic hyperuricemia, and hypercholesterolemia demonstrated a significant correlation with the number of coronary artery lesions.

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