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FEATURES OF THE STRUCTURE AND DEGREE OF SEVERITY OF COMORBID PATHOLOGY AND RISK FACTORS OF DEVELOPMENT OF MYOCARDIAL INFARCTION IN PATIENTS OF A PROFILE HOSPITAL

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Abstract

Introduction: The presence of high comorbidity, risk factors lead to a worsening of the course and an unfavorable outcome of acute myocardial infarction (AMI). Taking into account gender and age characteristics, the study of the most important risk factors will help in the future create activities focused on combating comorbidity. The main benefit of this work is the identification and management of high-risk patients.

The aim of the study: study of risk factors, structure and severity of comorbid pathology and its influence on the clinical course of AMI in different gender-age groups of patients.

Materials and methods: The retrospective study included case histories of 634 patients with a favorable outcome of AMI. The study group is represented by 63.9% of men and 36.1% of women. The comorbidity of AMI patients was assessed using the Charlson comorbidity index (IC). The patients were divided into 3 groups: Group I (low comorbidity, ICR≤3 points); Group II (average comorbidity, CI 3-5 points); Group III (high comorbidity, CI ≥5 points).

Results and discussion: Compared to women, men were more likely to have AH 89.7%, hypercholesterolemia 75%, overweight 40%, smoking 31.5%, obesity 31%, diabetes mellitus 24.4% and impaired glucose tolerance in 20% of patients. The average number of nosologies was 3.7 ± 1.04. The Charlson comorbidity index is 5.5 ± 1.9 points. There was a high 47.3% and moderate comorbidity of 48.3%. A high comorbidity index was found in men (49.7%), in women (50.3%). Patients with high comorbidity often had recurrent AMI (59.1%, p = 0.001). A direct correlation was found between the severity of coronary artery disease, age, and the severity index of comorbidity (r = 0.32, p = 0.001). Compared to the three women, the vascular lesion of the coronary bed was more detected in men 64.1%, p = 0.001. Considering the structure and severity of comorbid pathology in patients with AMI, there was a low 10-year survival rate according to the comorbidity index.

Conclusion: Most of the patients with risk factors and comorbid pathology were men. The patients with AMI studied by us had high and moderate comorbidity; more often these patients had repeated AMI, multivessel coronary artery disease and a decrease in the frequency of coronary angiography, then PCI. When calculating the comorbidity index, a low 10-year survival rate was revealed. This work proves the need for timely correction of risk factors, improvement of comorbidity management tactics, which helps to reduce the unfavorable course of AMI.

Key words: *myocardial infarction; risk factors; comorbidity; comorbidity index; coronary angiography; gender differences.*

Резюме

ОСОБЕННОСТИ СТРУКТУРЫ И СТЕПЕНИ ТЯЖЕСТИ КОМОРБИДНОЙ ПАТОЛОГИИ И ФАКТОРЫ РИСКА РАЗВИТИЯ ИНФАРКТА МИОКАРДА У ПАЦИЕНТОВ ПРОФИЛЬНОГО СТАЦИОНАРА

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Введение: Наличие высокой коморбидности факторов риска ведут к ухудшению течения и неблагоприятному исходу острого инфаркта миокарда (ОИМ). Учитывая гендерные и возрастные особенности, изучение наиболее важных факторов риска помогут в дальнейшем создавать мероприятия, ориентированные на борьбу с коморбидностью. Основным благоприятным результатом в этой работе является выявления пациентов повышенного риска и работа с ними.

Цели исследования: изучение факторов риска, структуры и степени тяжести коморбидной патологии и ее влияние на клиническое течение ОИМ у различных гендерно-возрастных групп пациентов.

Материалы и методы: В ретроспективное исследование были включены истории болезни 634 пациентов с благоприятным исходом ОИМ. Исследуемая группа представлена: 63,9% мужчин и 36,1% женщин. Коморбидность больных ОИМ оценивали с помощью индекса коморбидности (ИК) Чарлсона. Больные были разделены на 3 группы: I группа (низкая коморбидность, ИКЧ≤3 балла); II группа (средняя коморбидность, ИКЧ 3-5 баллов); III группа (высокая коморбидность, ИКЧ ≥5 балла).

Результаты: По сравнению с женщинами у мужчин чаще встречались АГ - 89,7%, гиперхолестеринемия - 75%, избыточная масса тела - 40%, курение - 31,5%, ожирение - 31%, СД - 24,4% и нарушение толерантности к глюкозе у 20% пациентов. Среднее количество нозологий составило 3,7±1,04. Индекс коморбидности Чарлсона 5,5±1,9 балла. Отмечалась высокая у 47,3% и средней степени тяжести коморбидность у 48,3%. Высокий индекс коморбидности встречался у мужчин (49,7%), у женщин (50,3%). У больных с высокой коморбидностью часто встречались повторный ОИМ (59,1%, p=0,001). Выявлена прямая корреляционная связь между степенью тяжести поражения коронарных артерий, возрастом и индексом тяжести коморбидности (r=0,32, p=0,001). По сравнению с женщинами трех сосудистое поражение коронарного русла больше выявлялось у мужчин 64,1%, p=0,001. Учитывая структуру и степень тяжести коморбидной патологии у пациентов с ОИМ оказалась низкая 10 – летняя выживаемость по индексу коморбидности.

Выводы: Большую часть пациентов с факторами риска и коморбидной патологией анамнез составили мужчины. У исследованных нами пациентов с ОИМ отмечалась высокая и средней степени тяжести коморбидность, чаще у этих пациентов регистрировались повторный ОИМ, многососудистые поражения коронарных артерий и снижение частоты проведения коронароангиографии, далее ЧКВ. При подсчете индекса коморбидности выявлена низкая 10 летняя выживаемость. Данная работа доказывает о необходимости своевременной коррекции факторов риска, улучшения тактики ведения коморбидности, что способствует снижению неблагоприятного течения ОИМ.

Ключевые слова: *Инфаркт миокарда; факторы риска; коморбидность; индекс коморбидности; коронароангиография; гендерные отличия.*

Түйіндеме

ПРОФИЛЬДІ АУРУХАНА НАУҚАСТАРЫНДА МИОКАРД ИНФАРКТІ ДАМУЫНЫҢ ҚАУІП ҚАТЕР ФАКТОРЛАРЫ ЖӘНЕ КОМОРБИДТІ ПАТОЛОГИЯСЫНЫҢ АУЫРЛЫҚ ДӘРЕЖЕСІ МЕН ҚҰРЫЛЫМ ЕРЕКШЕЛІКТЕРІ

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Кіріспе: Жоғары дәрежелі коморбидттілік, қауіп қатер факторлары жедел миокард инфаркт (ЖИМ) ағымының нашарлауына және қолайсыз болжамға алып келеді. Жыныс және жас ерекшеліктерін ескере отырып, маңызды қауіп қатер факторларын зерттеу келешекте коморбидттілікпен күресуге арналған шараларды құруға үлкен мүмкіндік береді. Бұл жұмыстағы ең маңызды нәтиже жоғары қауіптегі науқастарды анықтап, сонымен жұмыс жасау болып табылады.

Зерттеудің мақсаты: қауіп қатер факторлары, коморбидті патологияның құрылымы, ауырлық дәрежесін зерттеп, олардың әртүрлі жас-жыныстық топ науқастардың инфаркт миокардының клиникалық ағымына әсер етуін зерттеу.

Зерттеу материалдары және әдістері: Ретроспективті зерттеуге нәтижесі қолайлы болған инфаркт миокарды бар 634 науқастың ауру тарихы талқыланды. Зерттелген топ 63,9% ер и 36,1% әйелден құрылды. Жедел инфаркт миокарды бар науқас коморбидтілігі Чарлсон коморбидтілік индексімен (ЧКИ) бағаланды. Науқастар 3 топқа бөлінді: I топ (төмен коморбидтілік, ЧКИ ≤3 балл); II топ (орта коморбидтілік, ЧКИ 3-5 балл); III топ (жоғары коморбидтілік, ЧКИ ≥5 балл).

Нәтижелер мен талқылау: Әйелдерге қарағанда ер адамдарда жиі АГ 89,7%, гиперхолестеринемия 75%, дене салмағының артық болуы 40%, темекі шегу 31,5%, семіздік 31%, ҚД 24,4% және глюкозаға толеранттылықтың бұзылуы 20 % науқастарда кездесті. Нозологиялардың орта саны 3,7±1,04 құрды. Чарлсон коморбидтілік индексі 5,5±1,9 балл. Науқастарда жоғары дәрежелі 47,3% және орта дәрежелі 48,3% коморбидтілік байқалды. Жоғары коморбидтілік индекс ер адамдарда (49,7%), әйелдерде (50,3%) бірдей болды. Жоғары коморбидтілігі бар науқастарда инфаркт миокарды жиі қайталанды (59,1%, p=0,001). Коронарлы артерияның ауыр зақымдалу дәрежесі, жас және коморбидтілік индексі арасында тікелей корреляциялық байланыс анықталды. (r=0,32, p=0,001). Әйелдерге қарағанда ер адамдарда коронарлы үш қантамырлық зақымдалу жиі анықталып отырды 64,1%, p=0,001. ЖИМ бар науқастарда коморбидті патология құрылымы мен ауырлық дәрежесін ескере отырып коморбидтілік индексі бойынша 10 жылдық болжам төмен болды.

Тұжырымдар: Қауіп қатер факторлары және коморбидті патология анамнезі бар науқастардың үлкен тобын ер адамдар құрады. Зерттелген ЖИМ бар науқастарда орта және жоғары дәрежелі коморбидтілік байқалды, осы науқастарда жиі қайталматы инфаркт миокарды, коронарлы артериялардың көптамырлық зақымдалуы және коронарография, кейіннен ТКӘ жасалу жиілігінің төмендеуі тіркелді. Коморбидтілік индексін санағанда 10 жылдық болжам төмен болды. Берілген жұмыс қауіп қатер факторларын уақтылы реттеуін, коморбидтілікті жүргізудің жақсаруының керек екенін дәлелдейді, ЖИМ ағымының жағымсыз өтуін төмендетуіне алып келеді.

Түйінді сөздер: *миокард инфаркті; қауіп қатер факторлары; коморбидтілік; коморбидтілік индексі; коронароангиография; жыныс ерекшеліктері.*

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Introduction

According to the WHO indicators, cardiovascular diseases (CVD) are the main cause of premature mortality, high morbidity and disability worldwide, causing negative economic damage to social development. According to world statistics, 31% of all deaths in the world are attributed to cardiovascular diseases. [13]. According to the total mortality rates from diseases of the circulatory system against the background of comorbid pathology, ischemic heart disease (IHD) is in the first place (48.1%), namely its acute form, myocardial infarction and cerebrovascular diseases (38.9%) [2,1].

According to the information of the official statistics of the Republic of Kazakhstan in 2019, mortality rates from CVD were 163, 14 per 100,000 people, of which 58.25 per 100,000 people were coronary heart disease. Mortality from acute myocardial infarction (AMI) was 8% of the number of patients who left the hospital [11].

According to WHO estimates, the aggregate of predicted mortality from cardiovascular diseases will grow steadily every year. The reason is the widespread prevalence of risk factors, comorbid pathologies and an increase in the elderly. As is known from literature sources, the prevalence of comorbidity increases with age. At the age of 50-59, 36% of patients have 2–3 nosologies, by the age of 60–69, up to 4–5 nosologies are already detected in 40.2% of patients, and at the age of 75 and older, 65.9% of patients have more than 5 nosologies [7]. Recent research data show that the most important risk factor for worsening the course of AMI is considered to be high comorbidity, which complicates the diagnosis of myocardial infarction, leads to forced polypharmacy, worsening the course and affecting the duration and unfavorable outcome of the disease.

Most studies indicate that, regardless of gender and nationality, the presence of concomitant diseases adversely affects the outcome of the disease, reducing life expectancy by several years, in comparison with persons who do not have comorbid pathology [17].

In AMI patients with high comorbidity in the clinical picture, there is often no manifestation of pain syndrome, the disease can proceed atypically, disguising itself as a clinic of a concomitant disease, this in turn complicates the diagnosis, thereby the patient may be admitted to non-core hospitals, which will lead to a significant delay in reperfusion therapy [3,9,12].

Currently, there is no sufficient scientific base for the management of patients with various comorbid conditions, and therefore, treatment is mostly carried out empirically. Practitioners desperately need an information base that will allow them to competently manage patients with multiple pathologies, relying on scientifically sound data [14].

Assessment of the severity of comorbidity will make it possible to predict the development of complications and the risk of death after myocardial infarction and allows practitioners to identify a high-risk group that requires

special attention, both in a hospital setting and in an outpatient clinic.

The aim of the study was to study risk factors, structure and severity of comorbid pathology and its influence on the clinical course of AMI**.**

Material and methods. The study was carried out on the case histories of patients in the GKP on the REM "City Cardiology Center" in Almaty.

The retrospective study included 634 medical records of an inpatient with a favorable outcome of AMI, who were inpatient treatment from january to june 2019. The study group is represented by 405 (63.9%) men and 229 (36.1%) women, the median age of patients was 65 [59; 73] years, for men - 62 [56; 69] years, for women - 71 [64 ; 58] years. Age categories of patients by years were classified by WHO: of them, young age from 25-44 years - 19 (3.0%), middle age from 44-60 years - 156 (24.6%) patients, elderly from 60 -75 years - 324 (51.1%), senile age from 75-90 years -131 (20.7%), centenarians over 90 years old - 4 (0.6%).

The comorbidity of AMI patients was assessed using the Charlson Comorbidity Index (CI) [28]. The patients were divided into 3 groups: Group I (low comorbidity, CI≤3 points) accounted for 4.4% (28) of the patient; Group II (average comorbidity, CI 3-5 points) - 48.3% (306) of the patient; Group III (high comorbidity, CI ≥5 points) - 47.3% (300) patients (рис.1). Also, to assess the severity of comorbidity, the total number of nosologies per patient was calculated.

This study included favorable cases of AMI based on a comprehensive assessment of the clinical manifestations of the disease: results of electrocardiography, echocardiography, laboratory data and coronary angiography. The exclusion criterion was AMI patients with fatal outcome.

Standard laboratory parameters were determined in all patients. The parameters of lipid metabolism (total cholesterol, triglycerides, high and low density lipoproteins) were studied, which were determined on the AU 680 analyzer, the troponin test was performed by enzyme immunoassay using the Access 2 analyzer. All analyzers of the Beckman Coulter apparatus, made in the USA.

All parameters determined by echocardiography (EchoCG), including Doppler, were performed on a Vivid E 95 (Jeneral Edition) ultrasound machine, made in the USA. Coronary angiography was performed using a Philips allure CV 20 angiograph, using a contrast medium Vipromide 370 mg / ml.

Statistical processing was carried out using the SPSS 13 software (IBM, USA). Variables with parametric distribution are presented as $\bar{x} \pm SD$ (mean ± standard deviation), nonparametric distribution as median [Me 25th; 75th percentile] or [Me Q1, Q3]. The Kolmogorov - Smirnov test with the Lilliefors correction was used to assess the nature of the distribution in the aggregate based on sample data. To analyze sample data from populations that differ from the normal distribution, nonparametric methods were used. To compare the qualitative variables, the Pearson $\chi 2$ test was used for paired values, using, if necessary, the correction for Yates continuity. Differences in the data were considered statistically significant at $p < 0.05$.

To compare the groups, we used the ANOVA test, the Kruskal-Wallis method, followed by an assessment of the differences between the groups. One-way Pearson correlation analysis was carried out; Spearman's coefficient was calculated for nonparametric distribution.

Results

Of all examined patients with AMI, 215 (33.9%) were diagnosed with AMI with ST segment elevation, the remaining 419 (66.1%) cases - AMI without ST segment elevation. Every third patient in 32.8% of cases had at least one MI in the past.

Among those hospitalized with AMI, 200 (31.5%) patients were smokers; of them 155 (77.5%) middle-aged men and 45 (22.5%) women prevailed, p = 0.0001 (Table 1). In our study, the body mass index (BMI) in patients with AMI was 26.8 [26; 29.4] kg; overweight patients accounted for 254 (40%), men predominated in comparison with women (66.5% versus 33.5%, $\chi 2 = 28.89$; p = 0.0001) and elderly people 104 (47.3 %). Obesity was detected in 197 (31%), men prevailed 102 (52%), elderly 107 (54.3%) p = 0.0001 (Table 1). Lipid metabolism disorders in the examined patients are represented mainly by an increase in the LDL level and were detected in 476 (75%) patients, the average LDL level was 3.42 ± 1.34 mmol / L. Most of the lipid metabolism disorders were found in men compared with women (303 (63.7%) versus 173 (36.3%)) and the overwhelming majority were elderly people 255 (53.6%), p = 0.002. The glucose level in the examined patients with AMI was 6.75 [5.6; 9.18] mmol / L. At the same time, impaired carbohydrate tolerance was detected in 127 (20%), diagnosed among men compared with women (56.8% and 43.2%, $\chi 2 = 21.1$; p = 0.0001), in elderly people 67 (53.6%), p = 0.029 (Table 1). Type 2 diabetes mellitus was detected in 155 (24.4%) patients with AMI, 80 (51.6%) in men and 75 (48.4%) among women p = 0.0001, more often among elderly people 93 (60 %) p = 0.02. Among the examined patients, AH was detected in 569 (89.7%), among men 345 (60.6%) and 224 (39.4%) women, p = 0.0001 (Table 1), in most of them AH III degree - 461 (81%), AH II degree was detected in 80 (14%), AH I degree in 28 (4.9%).

Table 1.

Prevalence of the main risk factors for the development of myocardial infarction among the examined patients.

Risk factors for developing myocardial infarction	Examined patients (n=634)	Men	Women	P
Smoking	200 (31,5%)	155(77,5%)	45(22,5%)	0,0001
Overweight	254 (40%)	169(66,5%)	85(33,5%)	0,0001
Obesity	197 (31%)	102(52%)	95(48%)	0,0001
Impaired glucose tolerance	127 (20%)	73(57,5%)	54(42,5%)	0,0001
Type 2 diabetes mellitus	155 (24,4%)	80(51,6%)	75(48,4%)	0,0001
Arterial hypertension	569 (89,7%)	345(60,6%)	224(39,4%)	0,0001
Dyslipidemia	476 (75%)	303(63,7%)	173(36,3%)	0,8

Among the examined patients, grade III hypertension was found in the majority of elderly patients in 259 (56.2%), which indicates an increase in the number of patients with a high degree of hypertension with age. Consequently, among the examined AMI patients, patients with III degree of hypertension, elderly men prevailed.

Charlson's comorbidity index was 5.5 ± 1.9 points. The average number of nosologies per patient with AMI is 3.7 ± 1.04 (from 1 to 10 nosologies). The characteristics of concomitant pathology, taken into account when calculating the IC of Charlson, are presented in table 2.

In the analysis, a high Charlson comorbidity index was determined in the same way in both men 149 (49.7%) and women 151 (50.3%) (Fig. 1).

When calculating the Charlson index of the prognosis of patients taking into account comorbidity, the 10-year survival rate in our studied patients with an average severity of comorbidity (3-5 points) was 77% - 21%, in patients with a severe degree (more than 5 points) less than 21% [28].

Table 2.

Comorbidity characteristic.

Comorbidity	Абс.(%)
Congestive heart failure	316(49,8)
Chronic kidney disease (GFR <60 ml / min / 1.73 m2)	185(29,2)
Type 2 diabetes mellitus, incl. with target organ damage	90(14,2) 65(10,3)
Peptic ulcer	72(11,4)
History of acute cerebrovascular accident, incl. with the development of hemiplegia	26(4,1) 33(5,2)
Connective tissue diseases	21(3,3)
Malignant tumors without metastasis	19(3)
COPD	17(2,7)
Moderate liver damage (history of viral hepatitis)	12(1,9)
Obliterating atherosclerosis of the vessels of the lower extremities (performed only in 59 (9.3%) patients)	11(1,6)

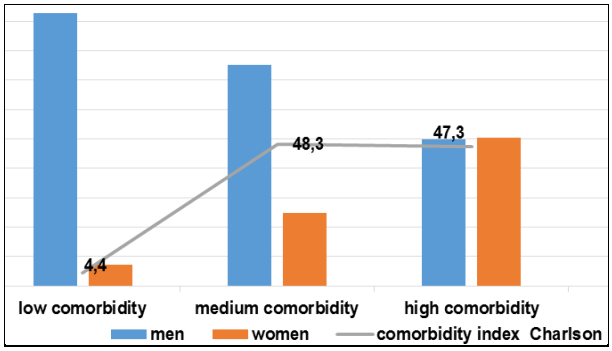

Fig. 1. Comorbidity in AMI patients and their gender ratio.

AMI patients with high comorbidity were older in age than patients with moderate and low comorbidity (72.00 [65.00; 80.00] and 61.00 [55.00; 66.00]; 44.50 [38 , 25; 47.00] years, respectively, p III-I <0.0001). The total number of nosologies in AMI patients also increased with age (r = 0.741, p = 0.001).

Patients with high and medium comorbidity according to the Charlson index compared with patients with low comorbidity had mainly AMI without ST-segment elevation (214 (71.3%) and 191 (62.4%) versus 14 (50%), p III– I <0.013). Patients with high comorbidity often had recurrent AMI than patients with low comorbidity (123 (59.1%) and 3 (1.4%), respectively, pII – I <0.001) (Fig. 2).

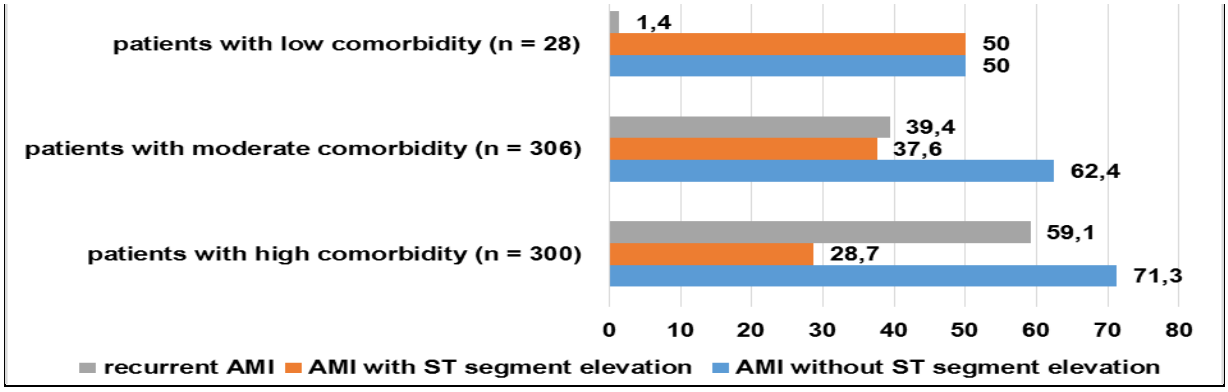

Fig 2. Assessment of AMI by the comorbidity index.

In the study of nosologies that were not taken into account in the Charlson comorbidity scale, it was revealed that in patients with AMI with high comorbidity, arterial hypertension was most common in comparison with patients with low comorbidity (287 (95.7%) and 17 (60.7%) cases, $\chi 2 = 40.36$; pIII – I = 0.0001), most patients had grade III hypertension - 461 (81%). Also, in the group of patients with high comorbidity compared with patients with low comorbidity, atrial fibrillation was more often observed (54 (18%) and 27 (8.8%) cases, respectively, $\chi 2 = 15.7$; pIII – I = 0.0001) and anemia (85 (28.3%) and 3 (10.7%) cases, $\chi 2 = 41.46$; pIII – I = 0.0001) (Table 3).

Table 3.

The structure of nosology not accounted for in the Charlson comorbidity scale in patients with AMI.

Nosology	Comorbidity group	Frequency of occurrence of nosologies	P
Arterial hypertension	Group I (low comorbidity, n = 28) Group II (medium comorbidity, n = 306) Group III (high comorbidity, n = 300)	60,7% 86,6% 95,7%	χ2=40,36; pIII -I=0,0001
Fibrillation atria	Group I (low comorbidity, n = 28) Group II (medium comorbidity, n = 306) Group III (high comorbidity, n = 300)	0% 8,8% 18,0%	χ2=15,7; pIII–I=0,0001
Anemia	Group I (low comorbidity, n = 28) Group II (medium comorbidity, n = 306) Group III (high comorbidity, n = 300)	10,7% 8,5% 28,3%	χ2=41,46; pIII–I=0,0001

Note: p III – I is the difference between the high comorbidity group and the low comorbidity group

Coronary angiography was performed in 540 (85.2%) patients; 77 (12.4%) voluntarily refused to conduct the study. The study found that, at their own request, patients of senile age from 75-90 years old, 48.6%, p = 0.028, the majority of women 40 (55.6%), p = 0.011, refused to undergo coronary angiography. According to the severity of the condition, the study was not carried out in the overwhelming majority of elderly patients from 60-75 years old, which amounted to 42.9%, p = 0.028, mainly in 11 men (78.6%), p = 0.011. The reason for not performing coronary angiography by the severity of the condition was the presence of 4-5 or more severe comorbidities in the patient, which occurred in 7 (50%) cases, p = 0.01 and the presence of early complications of AMI, p = 0.0001.

Analysis of coronary angiography data revealed that single-vessel lesions were found in 300 (55.5%), two-vessel lesions - in 62 (11.5%), three-vessel lesions - in 132 (24.4%), the trunk was affected in 10 (1, nine%). Myocardial revascularization (balloon angioplasty and coronary artery stenting) was performed in 340 (62.9%) patients. Conservative therapy was recommended for 59 (10.9%) patients, CABG was recommended for 141 (26.1%) patients.

From the study, it turned out that AMI patients with high and moderate comorbidity, compared with patients with low comorbidity, had three vascular lesions of the coronary bed according to coronary angiography 75 (58.6%), 51 (39.8%) and 2 (1.6%), respectively, p III – I <0.0001 (Fig. 3).

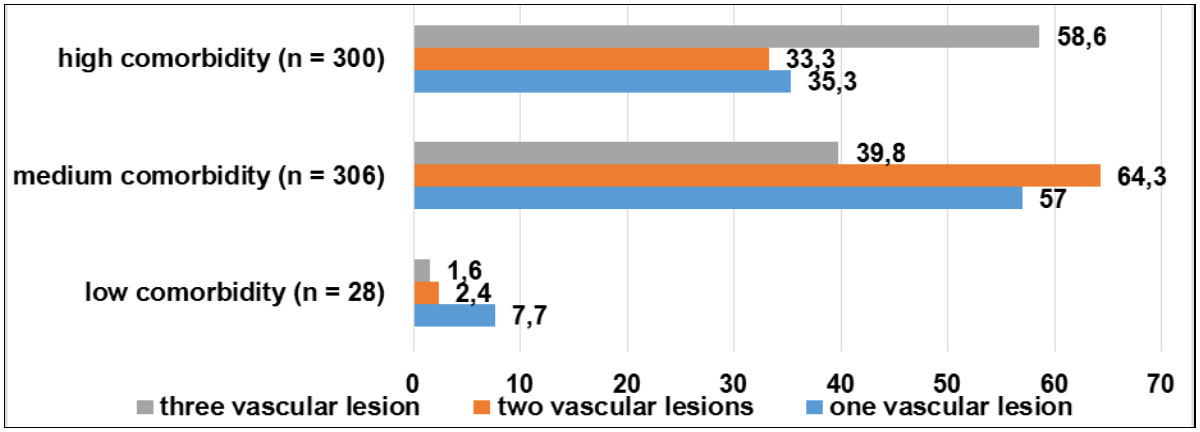

Fig. 3. Analysis of the severity of coronary artery disease in patients with myocardial infarction and comorbid pathology of varying severity.

Correlation analysis revealed a positive relationship between high comorbidity and multivessel coronary artery disease in AMI patients (r = 0.32; p <0.001). Compared with women of the three, coronary vascular lesions were more detected in men 46 (35.9%) and 82 (64.1%), respectively, p = 0.001 and mainly 37.5% higher in patients with AMI without ST segment elevation , p = 0.001. Also, multivessel coronary angiography was found to increase with age.

Discussion.

In the course of the analysis of the age structure, it was revealed that in our studied patients with AMI, elderly people predominated, whose average age was 65 [59; 73] years, the majority of men - 63.9%, who were 9 years younger than women.

From our study, it was noted that the average age of patients with myocardial infarction is consistent with the European register EUROASPURE V [19] and with the Russian register PROFIL-IM [8]. Both registers were dominated by men, elderly people. In the EUROASPURE V (European Action on Secondary and Primary Prevention by Intervention to Reduce Events) study, the average age of participants was 64 (10) years, 74% of men. In the PROFILE-IM register, the average age of the participants was 61.9 ± 11.9 (33; 87) years, 66.2% of men. Most of the patients studied by us had enough risk factors for the development of AMI and a high comorbid pathology anamnesis. At least one risk factor was present in all patients. For the patients examined by us, both non-modifiable and modifiable risk factors were identified,

among them AH was common - 89.7%, hypercholesterolemia 75%, overweight - 40%, smoking - 31.5%, obesity - 31%, diabetes - 24.4% and impaired glucose tolerance in 20% of patients. Most of the patients with risk factors and comorbid pathology were elderly men, which indicates a lesser adherence to this category of patients. Our results turned out to be lower compared to the EUROASPURE V register [8]. But the indicator of risk factors for AMI in our patients prevailed relative to the clinical characteristics of patients included in the RECORD-3 register of the Perm Territory [4].

Thus, the study found that patients with AMI were more likely to have high and moderate comorbidity; on average, one patient with AMI could have four comorbidities. The prevalence of comorbid pathology was comparable between men and women. The average Charlson comorbidity index was more than 5 points, which indicates a low 10 - year survival rate in our studied patients.

In our study, it was shown that the spread and severity of comorbid pathology depends on age. The older the patient, the more comorbidity, which is more severe.

Similar data were reflected in the Rochester Epidemiology Project, where multimorbidity increased sharply with age and the incidence of three or more diseases was comparable in men and women (25.5 / 1000 and 26.6 / 1000 person-years, respectively) [23]. In the frequency of detection of concomitant pathology, significant gender differences were not noted in many other studies [22,10,21]. However, in the work of Holzer, B.M., et al., where a meta-analysis was carried out from seven studies, conflicting data were obtained, where the prevalence of comorbidity in women was 3% higher than in men [27].

Similar data were presented in the works of M. Fortin et al., Where the structure and severity of the comorbid pathology increase with the patient's age [25]. In many other foreign studies, an increase in comorbid pathology with increasing age was also noted [5,15].

Individuals with high comorbidity require special attention, since a relationship has been revealed between a high degree of comorbidity and the frequency of recurrent AMI in them.

In the structure of comorbid nosologies that were not taken into account in the Charlson comorbidity scale, AH prevailed, in most AH grade III. According to this study, the rate was 18% higher compared to the DYSIS II multinational observational study of adults with ACS, where hypertension occurred in 77.7% [18].

From this study, coronary angiography and further PCI were not performed in patients with high comorbidity and the presence of early complications of AMI. These indicators are consistent with the data of many researchers, where there was a decrease in the frequency of PCI in comorbid patients [26, 24]. There are, however, other data on the lack of association of comorbidity with the activity of doctors in relation to the choice of endovascular revascularization [20]. The data from the German registry were comparable to our data, where patients with ACS and AHF were also less likely to undergo coronary angiography and PCI [29].

From the literature data, a work was found that was introduced to patients with ACS with comorbidity, where the effectiveness of conservative and invasive tactics was compared. This study enrolled elderly patients with comorbidity and was compiled from the results of the data from the SWEDEHEART register. Invasive tactics truly reduced the likelihood of developing a combined “endpoint” (hazard ratio 0.67 (0.54-0.83)) and death (hazard ratio 0.51 (0.39-0.65)) throughout the year [16,6].

Analyzing the severity of coronary artery lesions, according to the results of coronary angiography, it should be noted that in the group of patients with high comorbid pathology, multivessel coronary artery lesions were significantly more frequent.

Conclusions:

For the patients examined by us, risk factors are widely presented, among which the most common were AH - 89.7%, hypercholesterolemia 75%, overweight - 40%, smoking - 31.5%, obesity - 31%, diabetes - 24.4% and impaired glucose tolerance in 20% of patients. The prevalence of the main risk factors prevailed in older men compared with women. The analysis revealed that AMI patients have high (47.3%) and moderate (48.3%) comorbidity, which worsens the course of the disease and often leads to repeated AMI. The average number of nosologies per AMI patient averaged four comorbidities. Charlson's comorbidity index was 5.5 ± 1.9 points. There were no significant gender differences in the incidence of severe comorbidity among patients with MI. With increasing age of the patient, the severity of the comorbid pathology increased ($r = 0.741$, $p = 0.001$). The revealed high comorbidity determined a decrease in the frequency of coronary angiography, then PCI. Patients with high comorbid pathology had predominantly multivessel coronary artery disease. Compared with women of the three, vascular lesions of the coronary bed were more detected in men 46 (35.9%) and 82 (64.1%), respectively, $p = 0.001$. A direct correlation was found between the severity of coronary artery disease, age, and the index of severity of comorbidity according to the Charlson scale ($r = 0.32$, $p = 0.001$). Considering the structure and severity of comorbid pathology in patients with AMI, there was a low 10-year survival rate according to the comorbidity index.

Most of the data found were comparable with many international materials, which requires an assessment of the severity of comorbidity in patients with AMI, which will further predict the development of complications and the risk of death. This study provided a high-risk group that requires special attention, both in a hospital setting and in an outpatient setting.

The data of the analysis of retrospective work prove the need for timely control and correction of risk factors, as well as improvement of the tactics of managing comorbid pathology.

Currently, a definite scientific basis for the diagnosis and treatment of the severity of comorbid conditions has not been developed, which creates difficulties in the work of practical doctors. Further work is needed to create evidence-based evidence for the correct management of patients with varying degrees of comorbidity.

Contribution of authors:

Kedelbaeva Kamilya Maratovna - data set, descriptive part, statistical processing, analysis.

Berkinbaev Salim Fakhatovich, Dzhunusbekova Gulnar Aldeshevna, Tundybaeva Mira Kapsimetovna - scientific leadership, development of the concept and design of the study, approval of the final version of the article for publication.

Kubeeva Aizhan Shakmarovna - dataset.

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