

DOI: 10.34921/amj.2023.4.010

KƏSKİN MİOKARD İNFARKTI ZAMANI XƏSTƏLƏRDƏ İŞEMİK MƏNŞƏLİ MİTRAL QAPAQ ÇATIŞMAZLIĞININ YARANMASININ XÜSUSİYYƏTLƏRİ

L.R.Stetsyuk^{1,2}, İ.M.Kliş², İ.O.Stetsyuk^{1,3}, B.M.Todurov^{1,3},
M.B.Todurov³, O.V.Zelençuk^{1,3}, S.M.Sudakeviç^{1,3}

¹Ukrayna Səhiyyə Nazirliyinin Ürək İnstitutu, Kiyev;

²Horbaçevski ad. Ternopol Milli Tibb Universiteti, Ternopol;

³Şupik ad. Ukrayna Milli Səhiyyə Universiteti, Kiyev, Ukrayna

Xülasə. ST segmentinin yuxarı istiqamətdə yerdəyişməsi olan və olmayan miokard infarktının (MI) bilavasitə başlanğıc dövründə mitral requrgitasiyanın (MR) yayılmasını və ağırlıq dərəcəsini öyrənmək məqsədilə tədqiqat aparılmışdır.

Tədqiqatda kliniko-anamnestik metodlardan, obyektiv müayinə üsullarından isə laborator müayinə, elektrokardiografiya, exokardiografiya və koronarografiyadan istifadə edilmişdir.

Tədqiqat göstərmişdir ki, xəstənin kişi cinsinə mənsubluğu (66%), yaşının 67-dən çox olması, koronarografiyada çoxlu damar zədələnmələrinin olması (56%), revaskulyarizasiyaya qədər 31 saatdan çox vaxt keçməsi, sol mədəciyin atım fraksiyasının 40%-dən aşağı olması mitral requrgitasiyanın inkişafı üçün prediktor hesab edilə bilər. Orta səviyyəli MR-lə assosiasiya edən faktorlara yaş (66 ± 12 il), xəstənin kişi cinsinə mənsubluğu (62,5%, 16 nəfərdən 10-u), sol mədəciyin son diastolik ölçü indeksi (74 ± 13 ml/m²-dən az) və sol qulağın dilatasiyası (sol mədəciyin həcm indeksi – $52 \pm 14,8$ ml/m²) aid edilə bilər.

Müəlliflərin fikrincə, miokard infarktından sonra mitral requrgitasiyanın baş verməsi sol mədəciyin lokal və ümumi remodelləşməsi ilə əlaqədar olur. Bu proses miokard infarktının qabaqcadan məlum olan risk amillərindən asılı olmadan xəstəliyin nəticələrinə mənfi təsir göstərə bilər. Mitral requrgitasiya çox vaxt klinik əlamətlərsiz keçdiyinə görə miokard infarktı olan xəstələrdə vaxtaşırı exokardiografik müayinəyə ehtiyac vardır. Müayinənin aparılması mitral requrgitasiya dərəcəsinin miqdarca qiymətləndirilməsinə yönəldilməlidir.

Açar sözlər: mitral requrgitasiya, miokard infarktı, exokardiografiya, koronoa angiografiya

Ключевые слова: митральная регургитация, инфаркт миокарда, эхокардиография, коронарная ангиография.

Key words: mitral regurgitation, myocardial infarction, echocardiography, coronary angiography.

FEATURES OF OCCURRENCE ISCHEMIC MITRAL REGURGITATION IN PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

L.R.Stetsiuk^{1,2}, I.M.Klishch², I.O.Stetsyuk^{1,3}, B.M.Todurov^{1,3},
M.B.Todurov³, O.V.Zelenchuk^{1,3}, S.M.Sudakevych^{1,3}

¹Heart Institute of the Ministry of Health of Ukraine, Kyiv, Ukraine

²Horbachevsky Ternopil National Medical University, Ternopil, Ukraine

³Shupyk National Healthcare University of Ukraine, Kyiv, Ukraine

Summary. A study was conducted, the purpose of which was to evaluate the prevalence and severity of MR immediately following ST-elevation (STEMI) and non-ST-elevation myocardial infarction (NSTEMI) in contemporary clinical practice.

The research methods were clinical and anamnestic examination, objective examination, electrocardiography, laboratory diagnostics, echocardiography and coronary angiography.

It was found that the predictors of the development of mitral regurgitation against the background of acute myocardial infarction are male gender (66%), the age of patients older than 67 years, multivessel

damage according to coronary angiography (56%), time to revascularization is more than 31 hours, the ejection fraction of the left ventricle less than 40%. Factors associated with \geq moderate MR were age (66 ± 12), male gender (10 of 16 [62,5%], low LVEF ($39,94 \pm 7,02$); long time-to-revascularization ($31 \pm 4,7$ h); and dilatation of the LV (LVEDVi: 74 ± 13 ml/m²), and left atrium (LAVi: $52 \pm 14,8$ ml/m²).

Mitral regurgitation after myocardial infarction is the result of multifactorial processes involving local and global left ventricular remodeling. Consistent evidence underscores its adverse impact on outcomes, independently of previously known indicators of risk after myocardial infarction. As mitral regurgitation is often clinically silent, it should be systematically evaluated by echocardiography. The evaluation should include precise quantification of the degree of mitral regurgitation to best appraise the ensuing risk.

According to the Center of Medical Statistics, 40 000 cases of acute myocardial infarction (AMI) are diagnosed in Ukraine every year [1]. Clinically, myocardial infarction (MI) is diagnosed with an increase in cardiac biomarkers and the presence of signs of acute ischemia, which are confirmed by the patient's symptoms, electrocardiographic changes, and imaging results [2].

In recent years, the inhospital mortality of MI has decreased sharply due to the development of reperfusion centers and is 3% in 2020. [3,4,5]. However, pre-hospital mortality, which reaches 19,5%, remains a big problem [6].

Prognostically, infarction of the anterior wall of the left ventricle (LV) is more unfavorable, as it is associated with an increase in the frequency of acute heart failure, ventricular fibrillation, and death [7-10]. Some studies say that mortality within 30 days during the development of acute heart failure is 11% [11].

Ischemic mitral regurgitation (IMR) is a frequent complication of MI. It can occur following AMI due to reduced myocardial contraction at the site of papillary muscle insertion or papillary muscle displacement, resulting in leaflet tethering.

The severity of IMR may vary dynamically as a function of left ventricular loading conditions, heart rhythm, conduction system disease, and myocardial ischemia. Ischemic mitral regurgitation is a type of secondary mitral regurgitation that occurs after MI. Several studies have shown high risks of illness and death from cardiovascular disease among patients with symptomatic heart failure, reduced left ventricular systolic function, and moderate or greater degrees of IMR [12-16].

This study aims to evaluate the prevalence and severity of MR immediately following ST-elevation (STEMI) and non-ST-elevation myocardial infarction (NSTEMI) in contemporary

clinical practice. We also studied risk factors and predictors of outcome. All included patients underwent transthoracic echocardiography before discharge, with the aim of quantifying MR by the multiparametric method where possible.

Methods. The Kyiv Heart Institute is a major cardiac center in Ukraine. Between March 3, 2021 and November 16, 2022, records of patients admitted to Kyiv Heart Institute with type I acute myocardial infarction and treated by percutaneous coronary intervention were retrospectively examined. Patients transferred in from other centers were included. All included patients had transthoracic echocardiography (TTE) before discharge. Baseline demographic data and presenting features were recorded, including heart failure, time between symptom-onset and PCI and initial high-sensitivity troponin T (taken on admission. The maximum increase in troponin (peak) was also recorded (upper limit of detectable range > 26 ng/ml). Diagnoses of STEMI and NSTEMI were made by the admitting consultant cardiologist, according to standard international guideline definitions [17-23].

Transthoracic echocardiography was performed using Epiq 7 (Philips). Proximal flow convergence was assessed in the apical 4-chamber view, allowing for measurement of the proximal isovolumetric surface area (PISA) with reduced aliasing velocity and increased penetration depth. Effective regurgitant orifice area (EROA) was derived from a continuous wave Doppler profile of the MR jet in the apical 4-chamber view. Vena contracta (VC) width was assessed in the parasternal long axis view. MR was categorized as mild, moderate, or severe according to established criteria [24]. Left atrial (LA) and LV dimensions were indexed according to the Mosteller calculation of body surface area. LV ejection fraction (LVEF) was calculated by the Simpson's biplane method. LA volume was calculated using the biplane method from images acquired in the apical 4 and apical two chamber views at end-systole. LA dilatation was defined as

an indexed left atrial volume (LAVi) > 34 ml/m² [25].

Results. During this research 61 patients were diagnosed with AMI in 2021 and 2022. All 61 consecutive patients treated by PCI with recorded inpatient TTE were included. Median time from symptom onset to PCI for was 38,5 hours and 20 hours for patients with ischemic mitral regurgitation and without mitral regurgitation respectively (Figure 1). Baseline and demographic data are given in Table 1.

Mitral regurgitation was observed in 25 of 61 patients (41%), graded as mild n = 9 (36%), moderate n = 9 (36%) and severe n = 7 (28%).

Patients with MR were more commonly men (14 of 25 [66%] vs 30 of 36 [83%]; p <0,0146), older (67 ± 10 years vs 65 ± 11

years; p <0,001) and more likely to have a past history of hypertension (25 of 25 [100%] vs 35 of 36 [97%]; p = 0,015*) and previous MI (9 of 25 [36%] vs 8 of 36 [22%]; p = 0,044*). Patients with and without mitral regurgitation have the similar LVEF (37 ± 2% vs 40 ± 3%; p <0,001*). But patients with MR more often had kidney disease (12 of 25 [48%] vs 12 of 36 [33%]; p =0,048*).

On angiography, in patients with mitral regurgitation, the number of patients with a three-vessel lesion prevailed (14 of 25 [56%]). Hemodynamically significant stenoses that were treated prevailed in lesions left anterior descending artery (13 of 25 [52%] p < 0,001*) and right coronary artery (13 of 25 [52%] p= 0,018*).

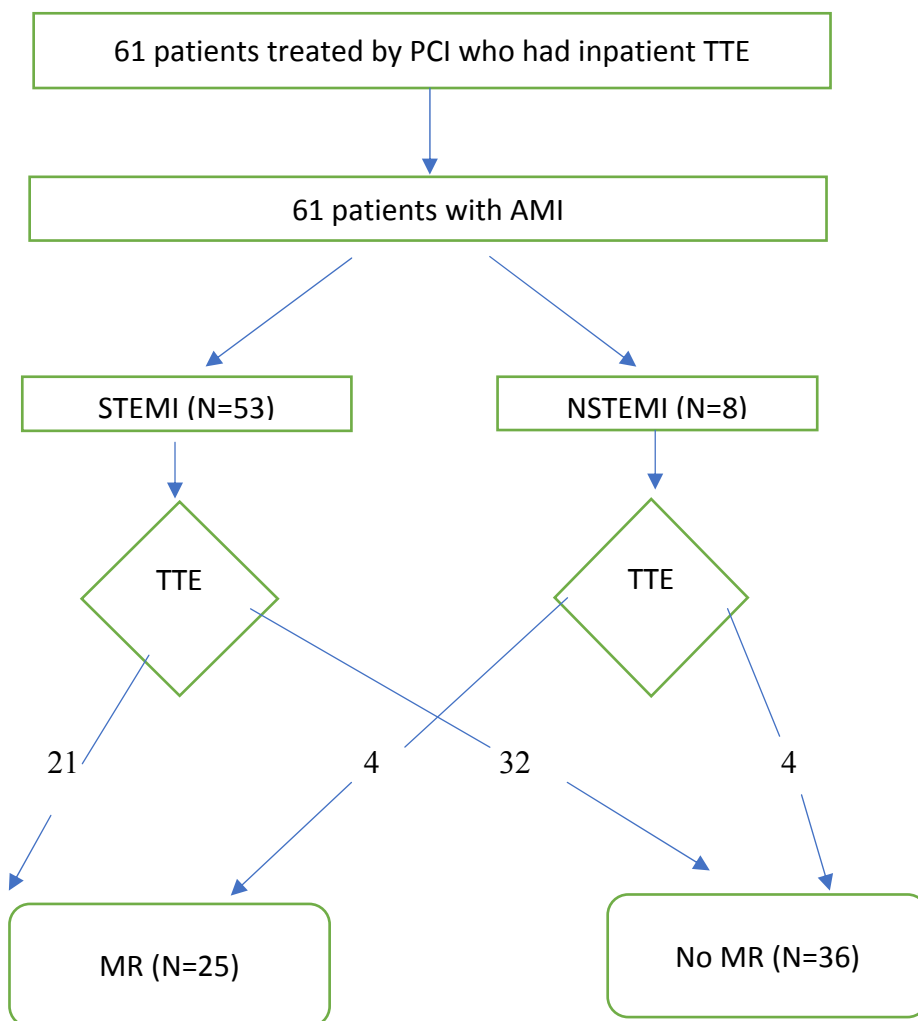


Figure 1. Consort diagram demonstrating the number of patients included in the study and their respective outcomes.

Table 1. Baseline and angiographic characteristics of the population

Variable	Mitral regurgitation		P value
	Yes (N = 25)	No (N = 36)	
Age (years)	67 ± 10	65 ± 11	<0,001*
Women	11 (44%)	6 (17%)	<0,046*
Smoker	17 (68%)	20 (56%)	<0,001*
Kidney disease	12 (48%)	12 (33%)	0,048*
Diabetes mellitus	9 (36%)	10 (28%)	0.854
Family history of CAD	16 (64%)	13 (36%)	<0,001*
Hypertension	25 (100%)	35 (97%)	0,015*
Previous MI	9 (36%)	8 (22%)	0,044*
Previous PCI	3 (12%)	1 (3%)	0,56
Presentation			
Mean LVEF (% § SD)	37 ± 2	40 ± 3	<0,001*
Initial troponin (ng/L)	3,05 ± 2,37	5,59 ± 7,84	0,046
Peak troponin (ng/L)	14,76 ± 11,52	17,32 ± 9,18	<0,001*
NSTEMI	4 (16%)	4 (11%)	0.895
Symptom onset to PCI time (h)	20	19,5	0,032*
STEMI	21 (84%)	32 (89%)	0.843
Symptom onset to PCI time (h)	38,5	20,2	0,32*
Severe disease by vessel			
Left main	1 (4%)	7 (19%)	0.46
Left anterior descending	1 (4%)	1 (3%)	< 0.001*
Left circumflex	1 (4%)	1 (3%)	< 0.001*
Right coronary	2 (8%)	1 (3%)	0.018*
Two vessel disease	7 (28%)	11 (31%)	0.001*
Three vessel disease	14 (56%)	16 (45%)	0.567
Treated coronary artery			
Bypass graft	1 (4%)	7 (19%)	0.75
Left main	1 (4%)	1 (3%)	0.45
Left anterior descending	13 (52%)	29 (81%)	0.006*
Left circumflex	7 (28%)	16 (45%)	0.003*
Right coronary	13 (52%)	13 (36%)	0.65
Intervention			
Drug eluting stent	61	55	0.254
Bare metal stent	1 (4%)	2	0.654
Ballon	1 (4%)	1 (3%)	0.345
Complication	1 (4%)	2 (6%)	0.015*

CAD = coronary artery disease; MI = myocardial infarction; CABG = coronary artery bypass grafting; PCI = percutaneous coronary intervention; LVEF = left ventricular ejection fraction; NSTEMI = non-st elevation myocardial infarction; STEMI = ST-elevation Myocardial Infarction;

* Denotes significant P values <0.05.

Moderate or severe MR was mostly graded using the multiparametric approach. Factors associated with \geq moderate MR were age (66 ± 12), male gender (10 of 16 [62,5%], low LVEF ($39,94 \pm 7,02$); long time-to-revascularization ($31 \pm 4,7$ h); and dilatation of the LV (LVEDVi: 74 ± 13 ml/m²), and left

atrium (LAVi: $52 \pm 14,8$ ml/m²). Lesions of the left anterior descending artery and the right coronary artery were the same (9 of 16 [56%] vs 9 of 16 [56%]). Mitral insufficiency prevailed in patients with STEMI (15 of 16 [94%] vs 1 of 16 [6%]) (Table 2).

Table 2. Characteristics of patients with versus \geq moderate mitral regurgitation

Parameter	Moderate and severe MR (N = 16)
Age (years)	66 \pm 12
Women	6 (37,5 %)
STEMI	15 (93,75%)
NSTEMI	1 (6,25%)
Initial troponin	3,28 \pm 2,71
Peak troponin	18,7 \pm 9,77
LVEF (%)	39,94 \pm 7,02
LVEDVi (ml/m2)	74 \pm 13
LAVi (ml/m2)	52 \pm 14,8
Symptom onset to PCI time STEMI patients (h)	31 \pm 4,7
Treated coronary artery (15 Drug eluting stents)	
Left main	0
Left anterior descending	9
Left circumflex	7
Right coronary	9

Values expressed as mean \pm standard deviation (age, LVEF, LVEDVi, LVESVi, LAVi), percentage within the population (male sex, STEMI, NSTEMI), or median with interquartile range (peak troponin).

LVEF = left ventricular ejection fraction; LVEDVi = indexed left ventricular end-diastolic volume; LAVi = indexed left atrial volume; STEMI = ST-elevation myocardial infarction; NSTEMI = non-ST elevation myocardial infarction.

** denotes statistical significance (P < 0.05)

Conclusion

According to the analysis, it can be concluded that the predictors of the development of mitral regurgitation against the background of acute myocardial infarction are male gender, the age of patients older than 67 years, multivessel damage according to coronary angiography, time to revascularization is more than 31 hours, the ejection fraction of the left ventricle less than 40%.

Mitral regurgitation after myocardial infarction is the result of multifactorial

processes involving local and global left ventricular remodeling. Consistent evidence underscores its adverse impact on outcomes, independently of previously known indicators of risk after myocardial infarction. As mitral regurgitation is often clinically silent, it should be systematically evaluated by echocardiography. The evaluation should include precise quantification of the degree of mitral regurgitation to best appraise the ensuing risk.

LITERATURE

1. Gandzjuk V.A. Analysis of incidence of ischemic heart disease in Ukraine // Ukrainian cardiology journal. 2014. № 3. P. 45-52.
2. Thygesen K., Alpert J.S., Jaffe A.S., Chaitman B.R., Bax J.J., Morrow D.A., White H.D. Executive Group on behalf of the Joint European Society of Cardiology (ESC) / American College of Cardiology (ACC)/American Heart Association (AHA) / World Heart Federation (WHF) Task Force for the Universal Definition of Myocardial Infarction (2018) // Circulation. 2018 Nov 13; 138 (20): e618-y651 DOI: 10.1016/j.heart.2018.08.004
3. WHO Global Health Workforce Statistics [online database]. Health Workforce. Geneva: World Heart Organization. 7. P. 42-43. who.int/hrh/statistics/hwfstats/en/

4. Dyuba D.O., Zhurovska Yu. M., Loskutov O. The issue of anesthetic support in interventional cardiology// *Medicine of urgent conditions*. 2017. №. 1(80). P. 125-128. DOI:10.22141/2224-0586.1.80.2017.94464
5. Ivanyuk N.B., Zharinov O.Y., Mikhalev K.O., Yepanchintseva O.A., Todurov B.M. Clinical characteristics and quality of life of patients with ischemic cardiomyopathy selected for revascularization interventions// *Ukrainian Journal of Cardiology*. 2016. №. 1. P. 21-28.
6. *Global Health Estimates 2015: Deaths by cause, age, sex, by country and by region, 2000–2015*. Geneva: World Health Organization, 2016 (http://www.who.int/healthinfo/global_burden_disease/estimates/en/index1.html, accessed 22 March 2017).
7. Shabbir M., Kayani A.M., Qureshi O., Mughal M.M. Predictors of fatal outcome in acute myocardial infarction // *J Ayub Med Coll Abbottabad*. 2008 Jul-Sep;20(3):14-6. DOI: <http://dx.doi.org/10.18203/2349-3933.ijam20174285>
8. Tusun E., Uluganyan M., Ugur M., Karaca G., Osman F., Koroglu B., Murat A., Ekmekci A., Uyarel H., Sahin O., Eren M., Bolca O. ST-segment elevation of right precordial lead (V4 R) is associated with multivessel disease and increased in-hospital mortality in acute anterior myocardial infarction patients // *Ann Noninvasive Electrocardiol*. 2015 Jul; 20(4): 362-7. DOI: [10.1111/anec.12199](https://doi.org/10.1111/anec.12199)
9. Marushchak M., Krynytska I., Lepyavko A. Association of serum uric acid with albuminuria in type 2 diabetic patients with comorbid obesity and/or essential arterial hypertension. *Ukrainian Journal of Nephrology and Dialysis*. 2022; 1(73): 58-69. doi: [https://doi.org/10.31450/ukrjnd.1\(73\).2022.07](https://doi.org/10.31450/ukrjnd.1(73).2022.07)
10. Kolesnyk, M., Stepanova, N., Kozliuk, N. Specialized medical care for chronic kidney disease patients during the war in Ukraine // *Ukrainian Journal of Nephrology and Dialysis*, 2022, (2), pp. 3–5
11. Leopoldo Pagliani, Nicolosi Elisa, Rivaben Dante Eduardo, Dal Corso Lorenza, Di Naro Agnese, Francesco Antonini-Canterin, Role of New Technologies in Supporting the Treatment of Complex Patients, *Heart Failure Clinics*, 10.1016/j.hfc.2021.01.009, 17, 2, (279-287), (2021). DOI: <https://doi.org/10.1016/j.hfc.2021.01.009>
12. Lamas G.A., Mitchell G.F., Flaker G.C. et al. Clinical significance of mitral regurgitation after acute myocardial infarction // *Circulation* 1997;96:827-33.
13. Grigioni F., Enriquez-Sarano M., Zehr K.J., Bailey K.R., Tajik A.J. Ischemic mitral regurgitation: long-term outcome and prognostic implications with quantitative Doppler assessment // *Circulation* 2001;103: 1759-64
14. Amigoni M., Meris A., Thune J.J. et al. Mitral regurgitation in myocardial infarction complicated by heart failure, left ventricular dysfunction, or both: prognostic significance and relation to ventricular size and function // *Eur Heart J* 2007;28:326-33.
15. Demikhova, N., Chernatska, O., Mazur, T. et al. Markers of cardiovascular complications in patients with type 2 diabetes mellitus and arterial hypertension // *Bangladesh Journal of Medical Science*, 2018, 17(2), pp. 319–322.
16. Yarmolenko, O., Bumeister, V., Polak, S. et al. The effect of the experimental chronic hyperglycemia on the kidney and myocardium // *Ukrainian Journal of Nephrology and Dialysis*. 2021; 3(71): 3–10. [https://doi.org/10.31450/ukrjnd.3\(71\).2021.01](https://doi.org/10.31450/ukrjnd.3(71).2021.01)
17. Roffi M., Patrono C., Collet J.P., Mueller C., Valgimigli M. et al. 2015 ESC Guidelines for the management of acute coronary syndromes in patients presenting without persistent st-segment elevation: task force for the management of acute coronary syndromes in patients presenting without persistent ST-segment elevation // *Eur Heart J* 2016;37:267–315.
18. Ibanez B., James S., Agewall S., Antunes M.J., Bucciarelli-Ducci C. et al. 2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation // *Eur Heart J* 2018;39:119-177.
19. Todurov M., Todurov B., Zelenchuk O. et al. A clinical case of alcohol septal ablation and transcatheter aortic valve implantation in an elderly patient with severe aortic stenosis and hypertrophic obstructive cardiomyopathy // *Azerbaijan Medical Journal*. 2023; 2: 157-163. doi: <https://doi.org/10.34921/amj.2023.2.025>
20. Demikhov O., Dehtyarova I., Motrechko V. et al. Management aspects of children's health: dysplastic-dependent pathology of the bronchopulmonary system and ecological heterogeneity of the environment // *Azerbaijan Medical Journal*. 2022; 1: 144–150.
21. Demikhov O.I., Shipko S.P., Sing H.H. et al. Intersectoral component of the healthcare management system: Regional programs and assessment of the effectiveness of prevention of bronchopulmonary dysplasia // *Azerbaijan Medical Journal*. 2020; 2: 88–96. doi: <http://doi.org/10.34921/amj.2020.2.03>
22. Prokopenko O., Toktosunova C., Sharsheeva N. et al. Prospects for the Reorientation of Investment Flows for Sustainable Development under the Influence of the COVID-19 Pandemic // *Problemy Ekorozwoju*, 2021, 16(2), pp. 7-17. <http://doi.org/10.35784/pe.2021.2.01>
23. Loboda A., Demikhova N., Smiianova O., Yasenok V. Improvement of the medical care quality management model based on the internal audit mechanism in the healthcare facility // *Eastern Ukrainian Medical Journal*. 2023; 11(2): 171-177. <https://doi.org/10.21272/eumj.2023>
24. Zoghbi W.A., Adams D., Bonow R.O., Enriquez-Sarano M., Foster E., Grayburn P.A., Hahn R.T., Han Y., Hung J., Lang R.M., Little S.H., Shah D.J., Shernan S., Thavendiranathan P., Thomas J.D., Weissman N.J. Recommendations for noninvasive evaluation of native valvular regurgitation: a report from the American society of echocardiography developed in collaboration with the society for cardiovascular magnetic resonance // *J Am Soc Echocardiogr* 2017;30:303–371.
25. Lancellotti P., Moura L., Pierard L.A., Agricola E., Popescu B.A., Tribouilloy C., Hagendorff A., Monin J.L., Badano L., Zamorano J.L., Sicari R., Vahanian A., Roelandt JRTC. European Association of Echocardiography

ОСОБЕННОСТИ ВОЗНИКНОВЕНИЯ ИШЕМИЧЕСКОЙ МИТРАЛЬНОЙ НЕДОСТАТОЧНОСТИ У БОЛЬНЫХ ОСТРЫМ ИНФАРКТОМ МИОКАРДА

Л.Р.Стецюк^{1,2}, И.М.Клищ², И.О.Стецюк^{1,3}, Б.М.Тодуров^{1,3}, М.Б.Тодуров³,
О.В.Зеленчук^{1,3}, С.М.Судакевич^{1,3}

1.Институт сердца МЗ Украины, Киев, Украина

2.Тернопольский национальный медицинский университет им. Горбачевского, Тернополь, Украина

3.Национальный университет здравоохранения Украины имени Шупика, Киев, Украина

Проведено исследование, целью которого было оценить распространенность и тяжесть митральной регургитации (МР) сразу после инфаркта миокарда с подъемом сегмента ST (ИМпST) и без подъема сегмента ST (ИМбST).

Методами исследования были клиничко-анамнестическое обследование, объективное обследование, лабораторная диагностика, электрокардиография, эхокардиография и коронарография.

Исследование показало, что предикторами развития митральной регургитации на фоне острого инфаркта миокарда являются мужской пол (66%), возраст больных старше 67 лет, многососудистое поражение по данным коронарографии (56%), время длительности до реваскуляризации более 31 часа, фракция выброса левого желудочка менее 40%. Факторами, ассоциированными с \geq умеренной МР, были возраст (66 ± 12), мужской пол (10 из 16 [62,5%]), низкая фракция выброса левого желудочка (ЛЖ) ($39,94 \pm 7,02$); длительное время до реваскуляризации (31 ± 4 , 7 ч); дилатация ЛЖ (индекс КДО 74 ± 13 мл/м²) и левого предсердия (индекс объема левого предсердия: $52 \pm 14,8$ мл/м²).

По мнению авторов митральная регургитация после инфаркта миокарда является результатом многофакторных процессов, включающих локальное и глобальное ремоделирование ЛЖ. Последовательные данные подчеркивают его неблагоприятное влияние на исходы, независимо от ранее известных показателей риска после инфаркта миокарда. Поскольку митральная регургитация часто протекает клинически бессимптомно, ее следует систематически оценивать с помощью эхокардиографии. Оценка должна включать точную количественную оценку степени митральной регургитации, чтобы лучше оценить возникающий риск.

Автор для корреспонденции:

Sehri M.Sudakevych, Department of Cardiac Surgery Endovascular and Extracorporeal Technologies of the P.L.Shupyk National Healthcare University of Ukraine- Kyiv- Ukraine

E-mail: sudakevych@gmail.com