

# The Effectiveness Analysis Of Medical Care Management In The Regional Vascular Center For Patients Of Elderly And Senile Age With Acute Myocardial Infarction

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## ABSTRACT

The article provides a post-hoc analysis in respect to the work of the regional vascular center (RVC) of the City Clinical Hospital named after M. P. Konchalovsky, which operates within the framework of the Regional program on specialized medical care in cases of acute coronary syndrome (ACS). The hospital has created a multidisciplinary team of doctors on the basis of RVC. The organizational measures helped to reduce the time interval from the moment of patients admission with ACS to the Hospital ER to the start of mechanical recanalization and stenting of the infarct-related artery. In addition it helped to increase operational activity and reduce the average bed-day of the patient's stay at hospital.

**Keywords:** multidisciplinary team, acute coronary syndrome, myocardial infarction, elderly and senile age, average bed-day, operational activity

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## RELEVANCE

With an increase in life expectancy, there is a natural increase in the number of elderly and senile people (65+), that often have diagnosis of cardiovascular diseases, primarily coronary heart disease (IHD). More than 60% of patients that died from acute coronary syndrome (ACS) and myocardial infarction (MI) are patients in the age older than 75 years [1, 2, 3]. The ischemic heart disease and its acute forms of comorbid pathology among the majority of elderly and senile patients, cognitive disorders, and reduced adherence to therapy may cause an increased risk of complications and adverse outcomes [4, 5]. Therefore, for patients of older age groups, caution and reasonable decisions are extremely necessary to the method selection process of diagnosis and treatment with the involvement of related specialists, i.e. a multidisciplinary approach to the treatment of such patients with MI is necessary. As for the decision-making in relation to treatment methods in emergency cases, the concept of disease management may come to the foreground, rather than the principle of "cure a patient, not the disease".

Until recently one considered the principle of "cure a patient, not the disease", has the foundation of more than 100 years and refers to the origins of the classical Russian clinical school by S. P. Botkin, as the only true principle of the clinical medicine. However, in recent years, without denial of an individual approach to the treatment of a particular patient, the concept of "disease management" has become increasingly popular in the system of health care within the organizational terms. This doctrine of "disease treatment" implies a multidisciplinary approach to the treatment of patients with a specific syndrome or condition. The advantage of this doctrine in contrast to the principle "cure the patient, not the disease" is that it uses practical recommendations for the diagnosis and

treatment of the syndrome or condition in accordance with the principles of scientific medicine [6].

Along with this, the modern clinical recommendations for the treatment of patients with ACS bases on data from randomized, controlled studies, in which for a long time the old or senile age was one of the exclusion criteria. The patients-participants of clinical trials, as a rule, have less than other chronic diseases, and MI in the elderly and senile age occurs with a combination of several chronic diseases that burden each other, i.e. in case of comorbide pathology. Therefore, the medical staff should very attentively observe the elderly and senile patients with MI due to the comorbidity of the disease [2, 4, 5].

In accordance with the above-mentioned statements **the purpose** of this work was to study the results of patients treatment with MI within the elderly and senile age and explain the need to create and implement in practice multidisciplinary teams (MDT) on the basis of Regional Vascular centers.

## MATERIALS AND THE RESEARCH

We examined 1,243 patients with MI who passed hospitalization for the emergency reasons at the City clinical hospital named after M. P. Konchalovsky from 2016 to 2019. We analyzed the results of treatment in respect to 908 patients with MI of elderly and senile age (over 60 years), which accounted for 73% of the total hospitalized patients number. One divided the patients into 4 groups in accordance with the year of hospitalization (table 1). The first group included 210 patients with MI who passed the hospitalization in 2016, a second group of 233 patients who passed the hospitalization in 2017, the third group of 247 patients passed the hospitalization in 2018 and fourth group 218 patients who passed the hospitalization in 2019. There were no significant differences in the gender and age in the groups of patients.

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Table 1: Average age of patients with MI (n = 908)

Years of hospitalization	Total	Middle age	Women		Middle age	Men		Middle age
			Abs. number	%		Abs. number	%	
2016	210	73.50	98	46.7	75.8	112	53.3	71.38
2017	233	73.77	120	51.5	76.4	113	48.5	71.01
2018	247	73.06	132	53.4	76.09	115	46.6	69.59
2019	218	73.7	106	48.6	76.93	112	51.4	70.70
Total	908	73.5	456	50.2	76.30	452	49.8	70.65

In accordance with the data in table 2, most of the patients under examination in the age over 60 with MI had the pre-existing and co-existing diseases, i.e. they were comorbid. Thus, hypertension was diagnosed in 82.5 % of cases, diabetes mellitus type II - in 60.5%,

various heart rhythm disorders - in 40.0%, chronic brain ischemia and a history of brain infarction-in 43.6% and 17.5% of cases, respectively. In addition, a significant number of patients (61.0%) under examination had signs of disability.

Table 2: Chronic diseases among the elderly and senile patients with MI (n=908)

The pre-existing and co-existing diseases among the patients with ACS	Absolute number	%
Total number of patients with MI	908	100%
Hypertensive disease	749	82,5%
Diabetes mellitus type II	548	60,5%
Chronic brain ischemia in past medical history	395	43,6%
Brain infarction in past medical history	159	17,5%
Arrhythmia in past medical history	445	49,0%
Disability	553	61,0%

The patients in the retirement age that live in the Zelenogradsky district of Moscow passed hospitalization to the clinic mainly for emergency reasons. A significant proportion of patients (72%) had bad habits in the form of smoking and drinking alcohol. We analyzed all cases of myocardial revascularization by PCI among the elderly and senile patients who passed hospitalization with MI for emergency indications during the period from 2016 to 2019. We also examined all cases when there were no emergency myocardial revascularization. The reasons for PCI failure had the structure by years with correspondent reflection of the dynamics.

In 2017, in order to improve medical care for the patients with elderly and senile myocardial infarction and as well to increase operational activity, reduce mortality among the patients with MI, reduce the "entry-carrier" time (the time spent in order to prepare a patient with MI for surgical treatment), improve the quality of patient treatment and, as a result, reduce the patient's time in hospital, one made a decision about the creation of MDT from the staff of the RSC duty services. The team included the following RVC specialists: heart health expert of the intensive therapy unit for patients of cardiology profile, neurologist of the intensive therapy unit for patients with CVA, doctor of the department of functional diagnostics (shift duty doctor), doctor-surgeon of the roentgen-endovascular unit, heart health expert of the cardiology unit for patients with MI, cardiovascular surgeon of the cardio surgery unit. Most of the employees passed the obligatory education in gerontology, precisely in order to provide more professional examination and communication with the patients of older ages.

One approved the creation and regulations of the RVC MDT in January 2017 by the executive order of the chief medical officer at the hospital. One approved the regulations of shift schedule in relation to all RVC MDT specialists. One assigns the duty cardiologist as the shift supervisor of RVC MDT by the order of intensive therapy unit for patients of a cardiological profile. The function of the shift supervisor, in addition to his duties, is to

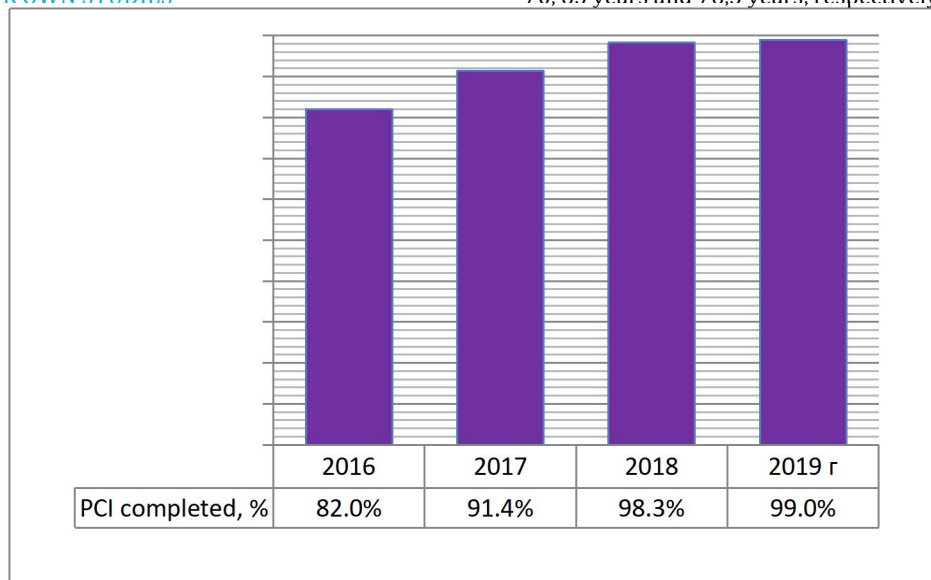
coordinate the work of team members, organize interaction with the side-by-side specialists, and provide information to the patient and his family. One transmits the ambulance information that a patient with ACS passes the transportation to the hospital through a special electronic system, which identifies the severity of the patient's condition, the nature of ACS and the presence of complications. All the specialists of RVC MDT immediately participated in the examination of a patient with ACS (assumption of MI), who passed the hospitalization via the EHS "infarct network" channel (in addition by invalid carriage of Emergency Health Service). Across the medical examination, the nurse of RVC MDT performed the registration of ECG and blood sampling, filled a "checklist" of the patient with IM. Also, during the medical examination, the patient was subject to echocardiogram and duplex sonography of the brachiocephalic arteries (which did not influence the "entry-carrier" time) by the doctor of functional diagnostics in RVC MDT.

In accordance with the results of physical examination, clinical data and results of laboratory and instrumental diagnostics, one made a decision in regard to the further routing of the patient. In case of MI confirmation, the patient immediately went to the x-ray endovascular laboratory with doctor and nurse of the RVC MDT without coronary care unit. Also, the endovascular surgeon examined the patients in order to assess the zones of hypokinesia and akinesia by the means of echocardiogram (in order to determine the infarct-related artery). In accordance with the changes in ECG, one identified the method of access. Every day before the start of duty shift, all employees of the RVC MDT passed a mandatory instructions, discussion of all patients who were in the cardiac intensive care unit or under observation in coronary care unit after the PCI just before. We made a comparative analysis in relation to groups of patients in accordance with the initial duration of coronary angiography from the moment of patient's admission to the Hospital ER (the "entry-carrier" time)

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before and after the creation of the RVC MDT. Under consideration that the "entry-carrier" time influences the volume of the affected myocardial zone, there was the assessment in relation to average fraction of the left ventricular ejection before the inpatient discharge. We also assessed the number of hospital bed-days spent by patients with ACS.

### RESULTS OF OUR OWN STUDIES



**Fig. 1.** The dynamics of operational activity within the acute period of myocardial infarction among the patients in the age older than 60 years (n = 908) from 2016 to 2019.

Hereafter, we conducted a comparative analysis of operational activity before and after the creation of MDT RVC CCH named after M. P. Konchalovsky. One analyzed all cases of PCI failures among the patients with MI of elderly and senile age. We found that at the hospital's operational activity grew dynamically from 2016 to 2019. Thus, in 2016, there was no emergency revascularization for 36 patients, or 18%. And in 2019, there was the emergency PCI for 99% of patients. There was no myocardial revascularization only in relation to 2 patients (Fig. 1).

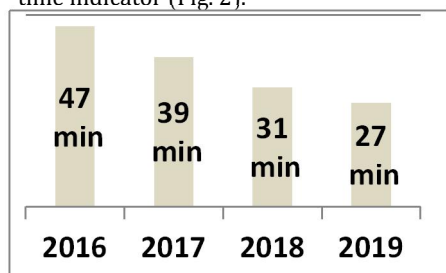
From 2016 to 2019, the City clinical hospital named after M. P. Konchalovsky received 908 patients in the age over 60 years with MI for the reason of emergency indications, which constituted 73% of the total patients number with ACS (1243 people). Among these 908 patients, 856 (94.3%) underwent emergency percutaneous coronary intervention. Among them there were 452 men (49.8 %). The average age of male and female patients constituted 70, 65 years and 76,3 years, respectively.

There was an analysis of reasons for failures of emergency PCI (table 3). During the follow-up period, 62 (6.8%) of the 908 the patients under examination did not pass myocardial revascularization for various reasons. In 2016-2017, the main reason for failure of emergency PCI was the patient's refusal, and in 2018, all patients gave their written consent to the operation. In 2019, only 1 patient did not sign a written consent for this procedure.

Table 3  
The analysis of reasons for failure to operate myocardial revascularization among the patients with ACS from 2016 to 2019 (n = 62)

	2016	2017	2018	2019
Patient's refusal	30	8	0	1
The later terms of hospitalization	2	6	4	1
Technical difficulties	1	6	0	0
Total	36	20	4	2

Thanks to the coordinated work of medical staff of RVC MDT, one managed to improve communication services and manipulations speed that decreased the patient's preparation time for surgery: decrease in the "entry-carrier" time indicator (Fig. 2).



**Fig. 2.** The average "entry-carrier" time among the patients with ACS in elderly and senile age from 2016 to 2019.

It is known that the earlier there is recovery of blood flow in the infarct-associated coronary artery, the smaller is the volume of the affected person. Our patients also showed a direct dependence of the affected myocardium volume on the duration of myocardial revascularization since the development of AMI. The early emergency myocardial revascularization (PCI) in the acute stage of myocardial infarction within our study helped to reduce the volume of the affected myocardium. In order to do this, all patients underwent transthoracic echocardiogram before the hospital discharge. As we see from table 4, in 2016 the total emission fraction was 45.7%, while in 2019 it reached 56.8% (p<0.001). There was also a decrease in the average bed-day of the patient's stay at hospital.

Table 4

## The Effectiveness Analysis Of Medical Care Management In The Regional Vascular Center For Patients Of Elderly And Senile Age With Acute Myocardial Infarction

The dynamics of operational activity, "entry-carrier" time, ejection fraction, average bed-day of hospital stay among the patients with MI (n = 908) under examination

Years of hospitalization	Abs. number of patients	Operational activity, %	The "entry-carrier" time, min.	The average LV EF, %	Average bed-day at hospital
2016	210	82.0	47	45.7	7.1
2017	233	91.4	39	51.7	5.3
2018	247	98.3	31	55.5	5.3
2019	218	99.0	27	56.8	5.6

### DISCUSSION OF RESEARCH RESULTS

Currently, IHD keeps its leading position in the mortality structure in Russia and the most developed countries. At the same time, the main cause of death for the patients with IHD remains MI [1, 5, 7]. In accordance with the Decree of the President of the Russian Federation dated May 7, 2012 No. 598 "On the improvement of state policy in the sphere of public health", one of the main activities of the Government of the Russian Federation is to reduce mortality from diseases of the blood circulatory system [8]. In order to solve this problem, there was establishment of primary vascular departments and regional vascular centers in the country. The main task of these medical establishments is to provide high-quality specialized and high-tech medical care for patients with MI by means of PCI [4, 9, 10].

In 2016, the Regional vascular center (RVC) started to operate in our hospital. Currently, PCI is a priority method of reperfusion among the patients with MI of any age, as well as elderly and senile patients. One found that in the case of timely PCI for MI among these patients, the number of deaths at hospital significantly decreases [3-5]. We conducted a retrospective analysis of the myocardial revascularization results by PCI method among 908 senile and elderly patients who passed the hospitalization to the City clinical hospital named after M.P. Konchalovsky for the reasons of emergency indications with a diagnosis of MI, which constituted 73% of the total patients number that passed the hospitalization (1243 people). One divided the patients into 4 groups in accordance with the year of hospitalization. Most patients were comorbid and had a combination of more than 2 chronic conditions. These conditions require much closer attention to patients, additional research and consultation with the help of related specialists. If you do not consider the comorbid background among the elderly patients, diagnosis may be inaccurate, and treatment may be unsafe [2]. Every fifth person in the age of 60 and older has a mental or neurological disorder [11]. Therefore, the symptoms of such conditions often do not receive proper attention and treatment, since they may coincide with other problems of old age. The risk of side effects increases [2]. In our study, the diagnosis of clinical symptomatology associated with chronic brain ischemia referred to 43.6% of cases. In addition, 17.5% of patients had previously suffered brain infarctions.

In 2017 RVC created MDT in order to solve the problem of complications and mortality reduction from MI. One formulated the functional responsibilities of each specialist in MDT. Henceforth, thanks to the competent work organization of this team, it became possible to significantly increase the operational activity. Thus, the proportion of patients who underwent myocardial revascularization after the creation of MDT constituted 98.7%, and before the creation of the team in 2016-2017 - 87.4 % (p<0.001). First of all, we managed to exclude

such a reason for failure of PCI among the elderly and senile patients with MI as categorical refusal of surgery. The number of patient refusals from surgical treatment among the elderly and senile patients decreased from 30 cases in 2016 to 1 case in 2019. The other reasons for failure of PCI were late hospitalization and technical difficulties within the procedure operation. One of the key factors that determine the prognosis of patients with MI is early myocardial revascularization. As a result of the organizational measures at hospital, the average "entry-carrier" time among the patients with ACS decreased from 47 and 39 minutes within groups I and II to 31 and 27 minutes within groups III and IV. Thus, the time interval from the moment of hospitalization to the start of PCI in relation to the infarct-associated artery reduced by 35%. The other researchers have also identified a reduction in this important time indicator after the end of organizational measures [10]. Thus, the organizational measures at hospital with the creation of specialized MDTs helped to improve the treatment results among the patients with MI without increase in financial costs. The integration of various specialists into MDT implies their close interaction and continuity in cases of the diagnosis and treatment in relation to the patients with MI.

### CONCLUSIONS

1. Among the patients with MI that passed the hospitalization in RVC, the number of elderly people with comorbid diseases prevailed. The introduction of MDT into clinical practice on the basis of RVC improved the effectiveness of treatment in relation to patients with MI of elderly and senile age.
2. The examination of the patient in the first minutes of stay in the RVC by various specialists of the RVC MDT helped to make a correct clinical diagnosis in a timely manner together with simultaneous decision on the need for emergency PCI.
3. Well-coordinated and highly professional work of RVC MDT specialists has proved its advantage: significantly increased operational activity due to a decrease in the number of refusals from PCI, significantly reduced the "entry-carrier" time (from 47 to 27 minutes).
4. A significant reduction in the "entry-carrier" time helped to reduce the volume of the affected myocardium and reduce the average bed-day of the patient's stay in the hospital.

### BIBLIOGRAPHY

1. Glushchenko V. A., Irklienko E. To. Cardiovascular morbidity - is one of the most important health problems // Medicine and health organization-2019. - Vol. 4. - No. 1. - P. 56-63.
2. Ryzhkova Yu. d., Kanareikina E. V., M. R. Alibegashvili and others Acute coronary syndrome among the

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- elderly patients: features of patient management // Clinician-2019. - N. 13 -- P. 19-26.
3. Engberding N., Wenger N. K. Acute coronary syndromes in the elderly // F1000Research. - 2017. - Vol. 6- P.1791 - 98.
  4. Gilyarov M. Y., Zheltouhova M. O., Konstantinova E. V., and others The treatment features of acute coronary syndrome among the elderly patients: experience of the City clinical hospital No. 1 named after N. I. Pirogova // Rational Pharmacotherapy in Cardiology-2017. - N. 13(2). - P. 164-70.
  5. Sauderson C.E., Brogan R.A., Simms A.D. et al. Acute coronary syndrome management in older adults: guidelines, temporal changes and challenges // Age and Ageing. - 2014. - V. 43 (4). P. 450-5. DOI: 10.1093/ageing/afu034.
  6. Simerson V. V., Garkina S. V., Gagloeva I. V. The multidisciplinary approach in the treatment of patients with chronic socially significant diseases // Bulletin of Samara state University, 2007, no. 307-316.
  7. Neumann F. J. et al. ESC / EACTS recommendations for myocardial revascularization 2018 // Russian journal of cardiology 2019, no. 8, P. 151-226.
  8. Chazov E. I., Boitsov S. A. The medical care to patients with acute coronary syndrome within the framework of the program for the establishment of regional and primary vascular centers in the Russian Federation // Cardiological Bulletin, 2008, Vol. 3, No. 2, P. 5-11.
  9. Kireev K. A., Fokin A. A. The role of the vascular center in the implementation of the regional program on specialized medical care for acute coronary syndrome // Healthcare of the Russian Federation. - 2016. Vol. 60. No. 3. - P. 116-120.
  10. Mitichkin A. E. Viskov R. V., Sementsov D. P., Stryuk R. I. The experience in organizing the work of work organization in the regional vascular center "City clinical hospital No. 36" of the Moscow Department of health for the treatment of patients with acute myocardial infarction // Medical business-2014. - no. 2. - P. 58-61.
  11. World Health Organization et al. Global action plan on the public health response to dementia 2017-2025. - 2017.
  12. Ticagrelor versus clopidogrel in Asian patients with acute coronary syndrome: A retrospective analysis from the Platelet Inhibition and Patient Outcomes (PLATO) Trial / H.J. Kang [et al.] // Am Heart J. - 2015. - Vol. 169. - P. 899-905.
  13. Time-honored treatments for the initial management of acute coronary syndromes: Challenging the status quo / C.P. McCarthy [et al.] // Trends Cardiovasc Med. - 2017. - Vol. 27. - P. 483-491.
  14. Zarudskiy A.A. Organizational, Clinical and Social Aspects of age-related sarcopenia diagnostics among the patients with obesity / A. A. Zarudskiy, E.A. Perutskaya, D.A. Perudskiy, N.Y. Stasevich, E.Y. Nemsstveridze // Journal of Pharmaceutical Sciences and Research. Vol. 9(6), 2017, 808-811.
  15. World report on ageing and health. Geneva: WHO, 2015.