International Journal of Biomedicine 1(2) (2011) 79-83

INTERNATIONAL JOURNAL OF BIOMEDICINE

Clinical Research

In-Hospital Outcomes of Patients Older Than 65 Years of Age with Acute Myocardial Infarction in the Central Asian Region

Aleksey G. Nikishin, PhD*, Ravshanbek D. Kurbanov, PhD, ScD, Mahmudjon M. Pirnazarov, PhD, Yayra Askarova

Republican Specialized Center of Cardiology, Tashkent, Uzbekistan

Abstract

Background: To detect distinctive features of the clinical course for acute myocardial infarction (AMI), treatment tactics, and clinical outcomes in elderly patients of the Central Asian region. **Methods:** The study included 508 patients who were assigned into two groups: Group 1 consisting of patients older than 65 years of age with AMI and Group 2 consisting of those younger than 65 years. The mean time from AMI onset to hospital admission was studied, as well as the number of patients admitted during the first 6 hours after onset, the number of patients treated with streptokinase and its efficacy, clinical course of AMI, and in-hospital outcomes. **Results:** The mean time for hospital admission in the group of patients older than 65 years was significantly longer than in the control group: 1220±165 min versus 977±88 min ($p<0.05$). Out of 188 patients with ST segment elevation who were older than 65 years, only 14.3% received streptokinase compared to 25.5% in the control group where 149 patients had ST segment elevation. The clinical picture of AMI in both the study groups did not differ significantly. The groups were reliably distinguished by in-hospital mortality (9.4% against 2.86%; p=0.001; odds ratio (OR) 3.53 (1.43-8.67)), frequency of acute heart failure occurrence (33.89% versus 21.9%; p=0.001; OR 1.83 (1.22-2.74), and chronic heart failure development (41.31% versus 24.76%; p=0.000; OR 2.62 (1.78-3.86)). **Conclusion:** The main problem in elderly patients is a lower probability in achieving myocardial reperfusion (due to delay in seeking medical help and lower efficacy of thrombolytic therapy) and a higher occurrence of heart failure as a result. IJBM 2011; 1(2):79-83.

Key words: *acute myocardial infarction, elderly, in-hospital outcome, duration of hospitalization.*

Introduction

One of the recent trends in the past years in cardiology has been the study of discrete regional (geographic) characteristics of the cardiovascular disease clinical course, treatment and outcome, of myocardial infarction in particular [1]. Data, which are reflected in international recommendations, mainly refer to regions with Caucasian population and high socioeconomic status. It is not completely clear if and how such data can be applied to the Asian region. This is particularly true in the case of elderly patients, since this category of patients is the most problematic both from a medical and social point of view.

**Corresponding author: Aleksey G. Nikishin, PhD, Department of Acute Myocardial Infarction, Republican Specialized Center of Cardiology, 4, Osiyo str., 100052, Tashkent, Uzbekistan. Tel.: 998-97-119-6133.*

E-mail: angdoc@yandex.ru

In today's practice, for a patient younger than 60 years with acute coronary syndrome without ST elevation, the probability of dying during hospitalization is 1 out of 50, while for a patient older than 60 years of age this risk increases by 1 out of 10. Among those who survive, the highest risk of death within 30 days to 1 year after an attack remains in elderly patients (15% in patients >65 years old and 25% in patients >85 years old) [2].

Researchers of this problem point to a number of features that distinguish the clinical course of acute coronary syndrome in elderly patients: high mortality rate, high number of atypical forms of acute myocardial infarction (AMI), more frequent development of heart failure, undertreatment due to decreased access to therapy with main groups of medications as well as to invasive treatment [3, 4]. This work is dedicated to find out specific characteristics of treatment tactics and clinical outcomes in elderly patients of the Central Asian region.

Methods

This study included 508 patients both sex with AMI admitted to the cardiology departments of the Center of Cardiology during 2008-2009; patients were divided into two groups: Group 1 (298 patients) consisted of male and female patients of 65 years of age or older and Group 2 (210 patients) consisted of patients with AMI younger than 65 years of age. Patients with myocardial infarction diagnosed by clinical presentation, ECG signs, and positive troponin I test after 12 hours, and/or increased CK-MB more than 50% above normal level after 6 hours were included in the study. Clinical characteristics of both groups are presented in the table below (Table 1).

Table 1
Characteristics of included patients

Parameter	Older than 65 y. o. N (%)	Control group N (%)	P
Total number of patients	298	210	
Males	178 (59,7)	108 (51,4)	NS
Females	120 (40,2)	102 (48,6)	NS
Mean age, years	72,4±4,6	53,5±6,9	NS
Weight, kg	78±3,4	81±4,6	NS
AMI with ST elevation	188 (63,1)	149 (70,9)	NS
AMI without ST elevation	110 (36,9)	61 (29,0)	NS
Previous MI	76 (25,5)	45 (21,4)	NS
Arterial hypertension	130 (43,6)	89 (42,4)	NS
Diabetes mellitus	92 (30,9)	48 (22,8)	NS
History of congestive heart failure	91 (30,5)	58 (27,6)	NS

Note: *AMI –acute myocardial infarction*

The main characteristics such as number of STEMI and NSTEMI, previous myocardial infarction, and concurrent diseases were not significantly different in both groups, i.e. at baseline the cohort of patients older than 65 years was comparable to the control group. The mean time from the onset of clinical presentation of AMI to hospital admission was studied, as well as the number of patients hospitalized during the first 360 min (6 hours). The overall number of patients who received thrombolytic therapy with streptokinase (1.5 million units per hour) was estimated, as well as the number of patients who received their thrombolytic therapy during the first "golden" hour from the onset of AMI. Efficacy of the thrombolytic therapy was evaluated by indirect signs of reperfusion (pain cessation, ST segment resolution at least 50% during the first hour after thrombolytic therapy). The clinical picture of AMI was evaluated by the following parameters: typical pain, atypical pain, painless form, and presence of heart failure symptoms (shortness of breath). We also conducted an analysis on the basic in-hospital therapy for AMI: acetylsalicylic acid, clopidogrel, unfractionated heparin, statins, beta-blockers, and ACE inhibitors. Hospital outcomes included registration of death cases, re-infarction (repeat episode of prolonged pain or shortness of breath with negative ECG dynamics and increase of CK-MB more than 50% from baseline), occurrence of early post infarction angina, TIMI major bleeding, and development of signs of acute and chronic heart failure.

Statistical analysis: The data gathered were processed using Microsoft Excel and STATISTICA 6. The reliability of the variables for qualitative values was tested by Fisher-Irwin criteria. The difference between the groups was considered statistically significant at $p<0.05$. Besides, odds ratio values were calculated at 95% confidence interval.

Results

The mean time (Table 2) for hospital admission of patients older than 65 years of age was significantly longer

Table 2
Time-to-admission characteristics in study groups

Groups	Mean time of hospital admission, min	Patients admitted in first 6 hours (360 minutes), N (%)	P
1 group≥65 years old (n=298)	1220±165	75 (25.4)	0.07
2 group<65 years old (n=210)	977±88	74 (35.24)	
		OR 0.62 (0.42-0.91)	

than that of the control group: 1220±165 min versus 977±88 min ($p<0.05$). It is worth noting that in both groups the mean hospitalization time significantly exceeded the time recommended (less than 360 min) and the percentage of patients hospitalized during the first 6 hours was relatively low (35.24% in the control group versus 25.4% in the group of elderly patients; difference is not statistically significant). Thrombolytic therapy was received by 27 patients from the elderly group and 38 patients from the control group; i.e. of 188 patients older than 65 years of age with ST segment elevation, only 14.3% received thrombolytic therapy compared to 25.5% out of 149 patients with ST segment elevation in the control group (P=0.02). Among those patients who were admitted to hospital during the first 6 hours of clinical presentation, thrombolytic therapy was administered in 36% of cases (27 out of 75 patients) in the elderly group and in 51.3% in Group 2 (38 out of 74 patients) (P=0.09). Only four patients from Group 1 and nine from Group 2 were admitted to hospital during the first hour of AMI onset (P=0.57). Thrombolytic action was considered to be effective in 12 patients (44.4% of the patients received thrombolytic therapy) from the elderly group and in 21 (55.3%) from the control group. Thus, patients older than 65 years of age with AMI were hospitalized later. There is a tendency of insignificant character to elderly people receiving thrombolytic therapy less frequently than a younger group of patients.

The clinical picture of AMI did not differ significantly; atypical and painless forms of myocardial infarction in elderly patients were observed somewhat more often (13.75% versus 10.85% and 1.67% versus 0.47%), but the difference was not statistically significant (Table 3).

Table 3
Clinical picture of MI in the compared groups

Symptom	1 group (n=298)	2 group (n=210)	P	95%CI
Typical pain	252 (84.7%)	188 (89.5%)	0.028	0.37-1.10
Atypical pain	41 (13. 8%)	22 (10.5%)	0.070	0.75-2.24
Painless form	5 (1.7%)	1(0.5%)	0.171	0.41-30.75
Dyspnea	101 (33.9%)	46 (21.9%)	0.001	1.22-2.74

However, signs of heart failure were observed more often in elderly patients (33.89% versus 21.9%). This fact is somewhat paradoxical, taking into account a Q wave myocardial infarction development of a lesser frequency of 188 (63.1%) in the basic group compared to 154 (73.3%) in the control group (P=0.02), the difference being significant (in control above). Both groups were compared by rate of receiving standard medications during the hospitalization period; 86.15% of Group 1 received beta-blockers compared to 83.95% of Group 2. ACEI was received by 92.3% and 83.9%, aspirin by 98.4% and 97.53%, clopidogrel by 100% and 98.77%, statins by 53.6% and 52.8%, and unfractionated heparin by 100% of Group 1 and Group 2, respectively. Thus, no significant undertreatment of elderly patients with standard medications was detected. Overall, the management of acute coronary syndrome in both groups corresponded to international standards.

In-hospital outcomes of MI study in both groups are shown in Figures 1 and 2.

These results were compared by hard endpoints, such as death, re-infarction, recurrent angina, and bleeding. The groups were significantly distinguished by mortality rate (9.4 versus 2.86% P=0.001, OR 3.53 (CI 95% 1.43-8.67). The rest of the endpoints in both groups were comparable: re-infarction 9.4% versus 9.05% (P=0.012, OR 1.04 (95% CI 0.57-1.92), recurrent angina 26.85% versus 26.1% (P=0.08, OR 1.03 (95% CI 0.69-1.54), and TIMI major bleeding (3.2% versus 1.43% P=0.12, OR 2.15 (95% CI 0.57-8.03). On analyzing the occurrence of acute and chronic heart failure development, it became obvious that these outcomes were more frequent in the elderly group than in the second group. Acute heart failure developed in 33.89% and 21.9% of the patients in Group 1 and Group 2,

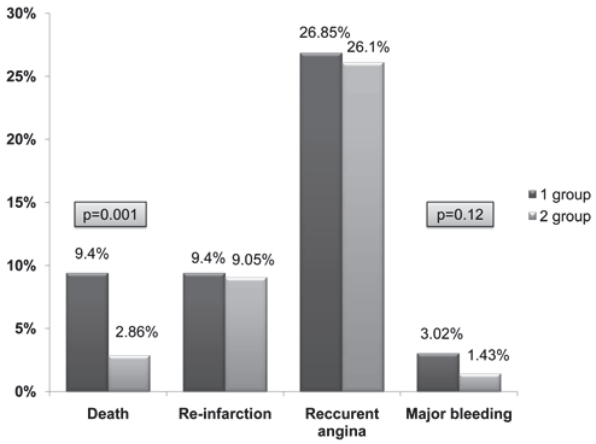

Fig. 1
In-hospital outcomes of MI in both groups

respectively (P=0.001, OR 1.83 (1.22-2.74)); the difference in chronic heart failure development was even more pronounced between the groups (41.31% in Group 1 versus24.76% in Group 2, P=0.000, OR 2.62 (1.78-3.86)).

Thus, the results of the study showed that elderly patients have a significantly higher risk of in-hospital mortality which may be explained by belated hospital admission and higher occurrence of heart failure. Differences in MI clinical picture, in-hospital therapeutic interventions, and frequency of ischemic events (re-infarction and recurrent angina) were not detected.

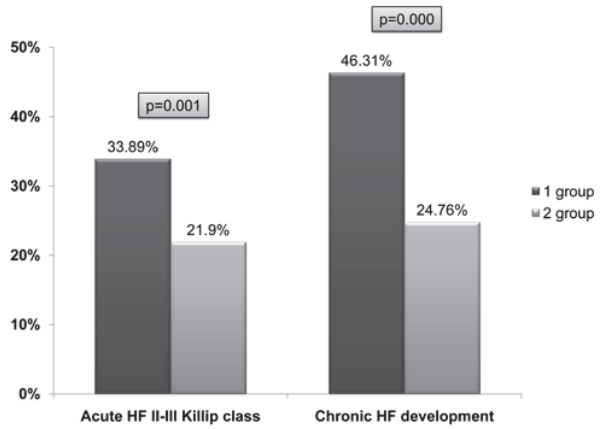

Fig. 2
In-hospital outcomes of MI in both groups

Discussion

According to recently published international data, the highest rate of cardiovascular mortality population with low and medium income per capita is observed in regions in Eastern Europe and Central (Middle) Asia and comprises 58% [5]. Undoubtedly, these data are an indirect reflection of problems present in the healthcare system and are especially true with regard to elderly patients. Unfortunately, similar information on the Central Asian region has been so far limited. The present studies on the problems of AMI in the elderly patients of Nepal and India demonstrate distressing data: the mean time of hospital admission for elderly patients in Nepal was 16 hours; in India this period was equal to 180-330 min (3-5.5 hours) [6, 7, 8]. Among patients who were admitted in the first 12 hours, 57.1–58.8% received thrombolytic therapy. Elderly patients had twice as many cardiovascular events as younger ones. Mortality was also higher among the elderly patients (24.4% versus 10.7%). Out of 19 elderly patients, 13 with acute coronary syndrome and ST segment elevation died during the in-hospital period. Elderly patients also received less beta blockers and a combination of aspirin and clopidogrel (60.3 versus 76%).

The Central Asian countries from the former Soviet Union have different social and economical system and have distinguishing features. First of all, there are almost no patients with AMI older than 80 years of age. Two reasons can explain this phenomenon: the average life expectancy in the country is about 70 years; patients older than 80 years of age and their relatives more often decline hospitalization. One possible explanation is fear of autopsy which is prohibited by Islam. This issue requires a more profound research in future. Secondly, in-hospital mortality of elderly patients is significantly lower compared to the data from South-Eastern Asia (9.4 versus 24%). Elderly patients do not yield to younger cohort in terms of receiving basic medications. This could possibly be the reason why the rate of cardiovascular events (re-infarction and recurrent angina) in elderly patients does not increase during hospitalization compared to the control group. The most problematic subject is the time of hospital admission of elderly patients with AMI and the availability of thrombolytic therapy: the mean time of hospital admission for a patient older than 65 years of age is more than 20 hours! To determine the reasons for such a dramatic delay in hospitalization requires a separate study, but we can assume that the main causes occur during the pre-hospitalization stage. The geographic availability of cardiology hospitals in Tashkent, a city with a population of 2.5 million, does not exceed 20 min. Each region of the city has at least one hospital equipped with emergency coronary care unit and three to four stations of ambulance. The mean time of patient delivery is not more than 30 min. Physical examination and ECG test for ACS take no more than 20 min. The problem is that elderly patients are not well-informed about ACS symptoms and rarely seek medical advice due to social, cultural, and financial reasons, postponing it until their condition becomes really aggravated, resorting to self-treatment (analgesics, sedatives, antacids, non-traditional medicine). Going to general practitioners also increases the time for hospitalization due to lack of ECG equipment and qualified personnel who know the ECG signs of AMI.

Only every third elderly patient who needs thrombolytic therapy actually receives it. In the meantime, clinical signs of reperfusion are achieved in less than half of the patients who receive streptokinase. These same distinctive features are probably responsible for a significantly higher occurrence of heart failure and mortality in elderly patients. Taking into account the prognosis of the WHO about the growth of patients with coronary artery disease at 120% more for women and 137% more for men in the subsequent decades [9], this issue will gain importance if no system is created for early detection of AMI and treatment for reperfusion.

Conclusions

Data received in our study correlate with the world data regarding in-hospital prognosis for elderly patients with AMI. There was no difference in frequency of painful and painless forms of myocardial infarction and adequacy of treatment with beta-blockers, statins, antiplatelet drugs, and ACEI. The main problem of elderly patients consists of a lower probability in achieving myocardial reperfusion (due to delay in seeking medical attention and lower efficacy of thrombolytic therapy) and a higher occurrence of heart failure as a result.

References

1. Rathore SS, Berger AK, Weinfurt KP, Feinleib M, Oetgen WJ, Gersh BJ, Schulman KA. Race, sex, poverty, and the medical treatment of acute myocardial infarction in the elderly. Circulation 2000; 102(6):642-8.
2. Avezum A, Makdisse M, Spencer F, Gore JM, Fox KA, Montalescot G, Eagle KA, White K, Mehta RH, Knobel E, Collet JP. Impact of age on management and outcome of acute coronary syndrome: observations from the Global Registry of Acute Coronary Events (GRACE). Am Heart J

2005; 149(1):67-73.
3. Brieger D, Eagle KA, Goodman SG, et al. GRACE Investigators. Acute coronary syndromes without chest pain, an under diagnosed and under treated high-risk group: Insights from the Global Registry of Acute Coronary Events. Chest 2004; 126:461-69.
4. De Servi S, Cavallini C, Dellavalle A. Non-ST-elevation acute coronary syndrome in the elderly: Treatment strategies and 30-day outcome The American Heart Journal 2004; 147:830-836.
5. Gersh BJ, Sliwa C, Mayosi DM, Yusuf S. The epidemic of cardiovascular disease in the developing world: global implications. Eur Heart J 2010; 31:642-648.
6. George E, Savitha D, Pais P. Pre-hospital issues in acute myocardial infarction. J Assoc Physicians India 2001; 49:320-323.
7. Joshi P, Islam S, Pais P. et al. Risk Factors for Early Myocardial Infarction in South Asians Compared With Individuals in Other Countries. JAMA 2007; 297(3):286-294.
8. Malhotra S, Gupta M, Chandra KK, et al. Prehospital delay in patients hospitalized with acute myocardial infarction in the emergency unit of a north Indian tertiary care hospital. Indian Heart J 2003; 55:349-353.
9. The future of CVD. In: Mackay J, Mensah G, eds. The Atlas of Heart Disease and Stroke. Geneva, Switzerland: World Health Organization; 2004;74-75.