THE INCIDENCE OF PECTORIS ANGINA POST-ACUTE MYOCARDIAL INFARCTION IN ROMANIA – RO-STEMI DATABASE

Catalina Liliana CALIN

PhD, Associate Professor
University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania

E-mail: ccatalina97@yahoo.com

Crina SINESCU

PhD, University Professor
University of Medicine and Pharmacy "Carol Davila", Bucharest, Romania

Claudiu HERTELIU

PhD, Assistant Professor, Statistics and Econometrics Department
University of Economics, Bucharest, Romania
Co-author of the books: Sistemul national de indicatori pentru educatie (2005),
Finantarea invatamantului preuniversitar de stat (2000)

E-mail: claudiu.herteliu@gmail.com, **Web page:** http://www.hertz.ase.ro

Abstract: *Cardio-vascular diseases are the major cause of mortality, with ischemic cardiac disease as the major form, followed by stroke. Each of these diseases accounts for some 15 million deaths per year, representing 30% of the total number of death. The highest mortality is registered in the countries of former USSR and those of Eastern Europe. France and Japan had the lowest rate of mortality by ischemic heart disease. This study is based on a retrospective analysis of the medical information provided by RO-STEMI database.*

Key words: *pectoris angina; myocardial infarction; RO-STEMI database; quantitative methods*

1. Introduction

Cardio-vascular diseases are the major cause of mortality, with ischemic cardiac disease as the major form, followed by stroke. Each of these diseases accounts for some 15 million deaths per year, represting 30% of the total number of death. The highest mortality is registered in the countries of the former USSR and those of Eastern Europe. France and Japan had the lowest rate of mortality by ischemic heart disease.

The World Health Organization observed the population of North America, Europe, China, Australia and Asia for ten years by MONICA project (MONItoring of trends and determinants in CArdiovascular diseases) to compare the mortality and the incidence of fatal events caused by cardiovascular diseases. The incidence of ischemic heart disease was

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highest in UK and Finland and lowest in China and Mediterranean countries. The explanation given by investigators was based on the different incidence of the risk factors: the serum level of cholesterol is highest in UK and Finland and lowest in China and Spain, while smoking has the highest incidence in Scotland and Ireland.

Despite the sustained effort for establishing the correct diagnostic and therapeutical approach for acute myocardial infarction (AMI), this still remains in the last 30 years the most important question of the health in developed countries.

In the USA around 1million persons are diagnosed each year with acute myocardial infarction. Although, the mortality rate has decreased by 30% in the last 10 years, one third of the patients still suffer fatal cardiovascular events.

Myocardial ischemia is the most common cause of mortality and morbidity. The most important ischemic causes of the chest pain after myocardial infarction are pectoris angina (PA) and reinfarctisation. Depending on the time interval when the angina appears, after myocardial infarction, we note two types: early - that appears in the first two weeks after AMI; and late – that appears after two weeks from AMI.

2. Methods

In this study we included 10.037 patients with AMI with ST elevation (STEMI) admitted in many departments of cardiology and internal medicine between 1996-2006 in different hospitals from Romania. This study was retrospective and it analyzed the medical information noted medical records of these patients. The incidence of earlier PA and its correlation with other medical events was analyzed in RO-STEMI database that records more then 60 variables both qualitative and quantitative.

Statistical analysis was performed by SPSS, ANOVA test and contingency tables.

3. Results

The incidence of earlier PA in RO-STEMI was 11.9%. Patients in RO-STEMI were between 18 and 94 years old. In order to study the correlation between earlier PA and age of patients we divided in several groups by age. We observed that there is a statistically significant correlation between earlier PA and age in each group. This correlation is presented in table 1.

Table 1. Correlation earlier PA – age

Age (years)	Patients rate	Incidence of earlier PA
18-30	0,8%	7,8%
31-40	5,2%	9,5%
41-50	20,3%	12,9%
51-60	30,8%	13,4%
61-70	35,1%	13%
71-80	7,4%	8,7%
81-94	0,5%	5,6%

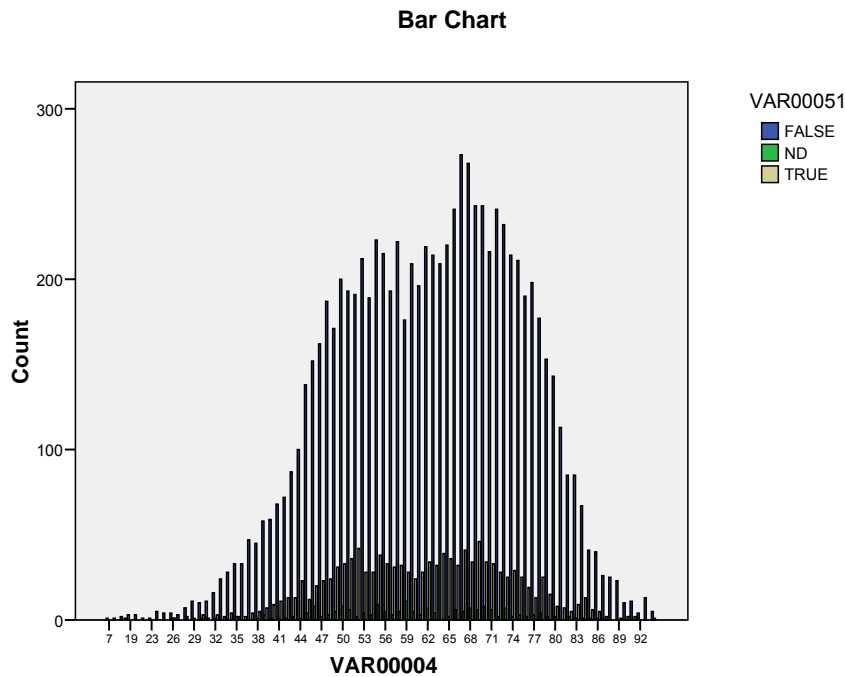*significance (P) is 0,002

Bar Chart

Figure 1. Distribution of earlier PA on age

From 10.037 patients 68,9% were males and 30,8% were females. Despite the higher number of males, the incidence of earlier PA was similar in both groups: 11,6% for males and 12,8% for females (p = 0,005). The risk factors which we studied to establish the correlation with the appearance of earlier PA were: smoking dislipidemia obesity mellitus diabetes, arterial hypertension and the history of myocardial infarction. Smoking was noted at 49,2% patients, the rest of 50,% was non-smoker. The incidence of earlier PA was 13,1% for smokers and 10,7% for non-smokers (p = 0,0001). 35,7% patients had dislipidemia and 64,3% had normal level for cholesterol and triglycerides. 15,4% patients with dislipidemia have earlier PA and 10% patients without this risk factor (p<0,0001).

At the physical examination, obesity was noted in the medical records at 21,5% patients. The incidence of earlier PA was 16,6% for these patients 78,5% patients had normal BMI in this group 10,6% patients were developed earlier PA (p<0,0001).

20,3% patients had the mellitus diabetes diagnostic. The incidence of earlier PA was 23,5% in diabetics group versus 11,5% in non-diabetics group (79,7% patients) (p=0,01). Arterial hypertension was registered in 50,9% patients, 49,1% had normal blood pressure. 13,7% was incidence of earlier PA in hypertensive's group and 10,1% in the group with normal blood pressure (p<0,0001). Positive history of MI were recorded at 9,9% patients. In this group 10,5% patients were developed earlier PA. The incidence of earlier PA in group without prior MI (90,1%) was 12,1% (p<0,0001). The incidence of earlier PA depending on the presence of the risk factors is presented in table 2.

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Table 2. Incidence of earlier PA depending on RF

Risk factor	Incidence of earlier PA in population with risk factor	Significance (P)	Rate of risk factor in population
Smoking	13,1% RF 10,7% NRF	0,0001	49,2%
Arterial hypertension	13,7% RF 10,1% NRF	0,0001	50,9%
Dsilipidemia	15,4% RF 10% NRF	0,0001	35,7%
Melitus diabetes	23,5% RF 11,5% NRF	0,01	20,3%
Obesity	16,6% RF 10,6% NRF	0,0001	21,5%
Prior MI	10,5% RF 12,1% NRF	0,0001	9,9%

The localization of AMI was established on EKG and echocardiographic criteria. At 49,1% patients AMI was localized on the anterior wall of the left ventricle, other localization (inferior, posterior, lateral or different combinations of these) were registered at 46,7% patients. 4,2% patients didn't have note in database the localization of AMI. In group of patients with anterior AMI the incidence of earlier PA was 12,9% versus 11,2% for patients with other localization for AMI (p=0,003).

Another important correlation at incidence of earlier PA was with Killip class of congestive heart failure at presentation. 67,9% patients with AMI-with elevated ST was in Killip I class at presentation, 17,2% in Killip II class, 8,7% in Killip III class and 6,1% Killip IV class. The higher frequency of appearance for earlier PA was at patients in Killip II class at presentation: 15,8%. Other distributions of earlier PA incidence was: 11,6% for Killip I class, 10% for Killip III class and 7,8% for Killip IV class.

The treatment of patients with AMI with ST elevation included many class of medication according to actual European and American guidelines for treatment. Medical drugs used were: thrombolytics, anticoagulants, antiagregants, beta-blockers, angiotensine-converting enzyme inhibitors and statins.

55% patients were treated by thrombolythic therapy. 14,3% of these were developed earlier PA (p<0,0001). It is known that there is a time limit (8 hours from the onset) until it is possible to administrate the thrombolyhtic therapy. We investigated if there is a correlation between the incidence of earlier PA and the promptitude of administration of this treatment. In the first 60 minutes from onset thrombolytic therapy was administrated at 89,8% patients, incidence of earlier PA was observed at 12,9% from this. Between 61 and 360 minutes 9,7% patients received thrombolytic therapy, from these, earlier PA was registered at 10,9%. From the other time intervals: 361-480 minutes, 481-720 minutes, 721-1440 minutes, > 1441 minutes the number of patients which received thrombolytic therapy were statistically insignificant (<30 patients) (p=0,015).

The successful of thrombolyses was established on clinic, EKG and bioumorale criteria. Based on this criteria, the rate of successful of thrombolyses was registered at 31,7% patients. From these, 13,9% were developed earlier PA. Unsuccessful of thormbolyses was registered at 44,9% patients and the incidence of earlier PA in this group was 15% (p<0,0001). It is important to notice that 23,4% patients didn't have registered in database this variable ("Success rate of thrombolyses").

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Antiagregant platelet medication was administrated at 84,9% patients with AMI with ST elevated, earlier PA was registered at 14,5% from these patients (p<0,0001). In patients group without antiagregant drugs (15,3%) incidence of earlier PA was 6,1%. The incidence of earlier PA according to the type of the antiagregant drugs is presented in table 3.

Table 3. The incidence of earlier PA according to the type of the antiagregant drugs

Type of treatment	Patients rate	Incidence of earlier PA
Aspirin	61,7%	13,2%
Clopidogrel	1,5%	22%
Aspirin + Clopidogrel	20,1%	11,8%
Integrilin + Aspirin + Clopidogrel	0,8%	12%
Aspirin + Integrilin; Integrilin; Tirofiban	insignificant	insignificant

*significance (P) is lower than <0,0001

Anticoagulant drugs was administrated to 93,4% patients. 12,3% patients with this kind of treatment were developed earlier PA (p<0,0001). From the 5,8% patients without anticoagulant treatment, 6,2% patients developed earlier PA. Similar to the case of antiagregant treatment we found a correlation between incidence of earlier PA and type of anticoagulant drug. The results registered were: heparin was administrated to 59,6% patients, from these were developed earlier PA 13,7%; enoxaparine was administrated to 23,1% patients, in this group earlier PA was noted at 10,7% patients; other types of anticoagulant drugs were administrated to 11% patients, the incidence of earlier was 9,3% for these patients (p<0,0001).

ACE-inhibitors was used to 65,3% patients, earlier PA appears to 15,3% from these (p<0,0001).

63,7% patients received beta-blocker treatment and the incidence for earlier PA was 14% in this group (p<0,0001).

Statins were used for 55,6% patients, earlier PA were developed at 15,7% patients (p,0,0001).

An important point of this study was to find the correlation between the incidence of earlier PA and other complications (determined by AMI or treatment). Congestive heart failure was registered in the final diagnosis at 24% patients, 22,2% of these having earlier PA too. Major bleeding defined that acute loss of blood which determines hemodynamic instability or severe decrease of hemoglobin, appears like an adverse event of thrombolytic therapy, anticoagulant or antiagreagnt drugs, were registered in the case of 0,5% patients, from these 33,3% developed earlier PA (p<0,0001). Pericarditis, another complication of AMI that appears like earlier PA in the first two weeks, was noticed at 0,5% patients 18,4% from these were developed earlier PA also (p<0,0001).

We studied the rate of incidence of earlier PA at patients with cardio pulmonary resuscitation because the most important complication of AMI is cardio respiratory arrest. In the first 12 hours from the onset of AMI was resuscitated 4,8% patients from these developed earlier PA 12,4% (p=0,05). Between 12 and 24 hours from the onset of AMI was resuscitated 0,08% patients and the incidence of earlier PA was 9,4% (p=0,013). 1,4% patients was resuscitated after the first 24 hours from the onset of AMI, 18,2% from these were developed earlier PA (p=0,043).

4. Discussion

The database created for the analysis of patients with AMI with elevated ST is the first one in Romania. The novelty character consists in realizing the first national study about this kind of pathology. Because of the lack of experience in this field, during the creation of the database and the data analysis we encountered some difficulties: the absence of a unitary methodology in completing the database fields, the usage of multiple codes, and the absence of a clear definition of the variables.

For data analysis we used comparison between our results and those published in medical literature. The incidence of earlier PA obtained using RO-STEMI corresponds with that of other medical sources: 20-30% in Heart disease – 7th edition – E. Braunwald, 8,2% in CAPTIM trial, 6,6% in ASSENT 3 trial. These differences are explained by socioeconomic and cultural tradition in Romania versus USA or west European countries.

The results obtained in RO-STEMI showed that males develop twice more times AMI with ST elevated. Despite this, the incidence of earlier PA was greater with females. The same results were obtained in the GUSTO 1 trial that showed the recurrence of post myocardial ischemia is more frequent at females. We explained these results by the fact that females have a higher tendency to come to the emergency room later because they minimalize the simptomatology, and this leads to treatment that does not include thrombolytic drugs.

The highest incidence of earlier PA was in 41-70 age groups. Analysis of the database show us that these patients have many risk factors and frequently localization of AMI at anterior wall of left ventricle. ASSENT 3 trial and ASSENT 3 PLUS trial showed the same results. In the 81-94 age group were included 0,5% patients, a very low number, that is determined by the highest mortality at this kind of patients because of the most frequently complications of AMI and because of the cultural model of these patients who refused the hospitalization.

Surgeon General's report published that the smoking increases the mortality by cardiovascular events with 50%. The highest incidence of earlier PA at smoker versus non-smoker was explained by the systemic atherogen effects induced by this risk factor.

INTERHEART trial noticed that the arterial hypertension is the third risk factor in development of adverse events post AMI, the incidence of earlier PA in this study has similar values with RO-STEMI.

The diagnostic of PA is based on clinical criteria. From this point of view we remained that the diabetic patients which have a lower level of pain is possible to obtain a false negative results for incidence of earlier PA.

The high number of patients with Killip I class is due to the fact that they rapidly come to the hospital. The literature data show that the incidence of earlier PA is highest at patients with Killip III and IV class. In our study the number of patients with Killip III and IV class is lower than in the international trials maybe because the mortality is higher.

In our study the incidence of earlier PA related with the treatment (beta-blokers, ACE-inhibitors, statins, antiagregant, anticoagulant) is similar to the incidence presented in the international trails. The great number of patients that presented in the first 60 minutes on the onset of AMI at hospital is beneficial for the success of the treatment mostly because of the thrombolytic therapy that can be administrated.

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5. Conclusion

The results of RO-STEMI database are similar with the ones published in medical international literature. RO-STEMI is the first database which recorded the cardiovascular pathology at the national level. It is necessary to extend this study by including other variables according to the international trials adapted to the Romanian geographic, cultural and socioeconomic particularities.

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