
Correlations between Lifestyle and Ischemic Heart Disease in Young Patient

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ABSTRACT

Myocardial infarction in young adults, an important public health issue, is a controversial topic with many issues left unknown. Although its prevalence is low, its consequences are disastrous, as it affects apparently healthy subjects who afterwards suffer important lifestyle changes with profound social, professional and medical implications. In this perspective, the thesis aims to analyze epidemiologic aspects regarding incidence, morbidity of myocardial infarction in young people (patients under 45 years) and correlation with traditional cardiovascular risk factors: tobacco use, effort, diet, dyslipidemia, obesity, hypertension and diabetes mellitus.

The is a descriptive, longitudinal, ambispective study: retrospective until 2004 and prospective for the next 10 years, including all 122 patients consecutively admitted to the Cardiology Department of Bagdasar-Arseni Hospital, aged under 45 and diagnosed with acute myocardial infarction. These represented 9% of all patients with this diagnosis. Considering the evolution, we notice an alarming increase in incidence, statistically significant ($p < 0.05$) for the second half of the analysed time interval.

The most common cardiovascular risk factors are: smoking, dyslipidemia, obesity. Diabetes mellitus and hypertension remain specific risk factors for patients over 45. A significant number of young patients met the diagnostic criteria of metabolic syndrome.

Cigarette smoking is the dominant risk factor found in 88% of patients. An increase in the incidence of smoking during the study is noticed. Dyslipidemia and obesity show a linear increase in the last decade. A statistically significant association between obesity-dyslipidemia-hypertension-diabetes among young men with acute myocardial infarction is described. In regard to these data, 70% of patients enrolled in the study presented a high-calorie diet at the time of enrollment, over 3000 kcal/day, and 63 % of patients did not practice physical exercise (including walking, cycling, dancing, gardening) (9).

In conclusion, a worrying increase in the number of young patients with acute myocardial infarction is noticed in recent years. The apparent causes are similar to those described in the elderly population, but their distribution is different. The main characteristic is an unhealthy lifestyle among the young: the overwhelming majority includes smokers, sedentary persons with high-calorie diet, a significant percentage of whom, meet the criteria of metabolic syndrome.

Therefore, programs focusing on primary and secondary prevention should be a priority in Romania, since they could reshape the cardiovascular disease spectrum.

Keywords: cardiovascular disease, Romania, risk factor, diet, obesity, dyslipidemia, hypertension, diabetes, inactivity, smoking, myocardial infarction, young

INTRODUCTION:

Cardiovascular disease is the leading cause of death worldwide, responsible for approximately half of the total number of deaths. There are 4.35 million deaths annually in Europe, with 1.9 million patients diagnosed with a cardiovascular disease, which induces disability and a decrease in the quality of life. (1, 2, 3)

While in Northern and Western Europe, mortality and cardiovascular disease incidence is decreasing, the situation is different in Central and Eastern European countries, where an increase is reported. Moreover, it has been noticed that economic progress is inversely proportional with the age of diagnosis, as the most productive population segments are affected. (4)

Although there is no precise epidemiological information about cardiovascular disease incidence in Romania, it can be estimated considering the number of deceases caused by myocardial infarction, which is increased in comparison to other European countries. (5)

The correlation between cardiovascular disease and a number of risk factors like arterial hypertension, dyslipidemia, diabetes, obesity, smoking, physical inactivity, emotional stress, food choices and genetic factors is well-known. Furthermore, the control of these factors before the occurrence of the disease (by primary prevention) and after the occurrence of the disease (by secondary prevention) is capable of reducing the incidence, prevalence, complications and mortality due to cardiovascular diseases, using simple and inexpensive methods.

According to WHO recommendations, in countries with an increasing incidence of cardiovascular disease, a high interest should be addressed to reveal the real frequency of these diseases, the prevalence of the associated risk factors and specific local factors, which will allow a better use of the health system resources for programs focusing on prevention. (2)

Myocardial infarction in young adults, an important public health issue, is a controversial topic with many issues left unknown. Although its prevalence is low, its consequences are disastrous, as it affects apparently healthy subjects who afterwards suffer important lifestyle changes with profound social, professional and medical implications.

As far as we know, there is no unified and systematic approach to this subject in Romania.

OBJECTIVES:

In this regard, the study aims to analyze the correlation between traditional cardiovascular risk factors and the occurrence of myocardial infarction in young people and to argue the beneficial role of the primary and secondary prevention programs.

THE METHODOLOGY AND THE DESIGN OF THE STUDY:

This is a descriptive, longitudinal, ambispective study: retrospective until 2004 and prospective for the next 10 years, including all 122 patients aged under 45 consecutively admitted to the Cardiology Department of Bagdasar-Arseni Hospital, diagnosed with acute myocardial infarction. 44 patients were retrospectively analyzed and 78 were prospectively analyzed. Information was collected using the clinical history, medical records, as well as questionnaires concerning lifestyle. The study group consisted of 1195 patients aged over 45, fulfilling the same diagnostic criteria. In order to make a more accurate longitudinal investigation and to characterize the dynamics of the studied phenomena, we divided the research time interval into years, starting from January 2000 till the end of July 2010.

A research sheet containing the following information was prepared:

- Demographic data: age, sex, area of origin.
- Living and working conditions: profession, workplace.
- Classical cardiovascular risk factors: family history, smoking, arterial hypertension, diabetes, dyslipidemia, obesity, leisure activities, diet.

For analysis and data collection of patients we have developed a tracking sheet using Microsoft Office Excel software. Data were collected from patient history, observation of records, from scheduled visits or telephone interviews.

All determinations were made using similar techniques. Statistical data were systemized in the form of synoptic charts (groups), represented graphically in the form of pie-charts, columns and curves of incidence. For classification purposes, we used Microsoft Access and Excel databases. Statistical analysis was performed using the usual statistical tests in Microsoft Excel version 2010 and SPSS version 19: proportions, mean standard deviation, medians, Pearson correlation, chi square and Fisher tests, t-test.

LITERATURE DATA

Mortality due to cardiovascular disease has been recording in the last 20 years a decreasing tendency in Western and Central Europe, reaching to 3-5 to 1000 people in 2003; in Romania the tendency was diametrically opposite, reaching to almost 8 to 1000 people the same year. This tendency has been exceeded only by Bulgaria, Ukraine and especially the countries of the former Soviet Union (2, 3, 4).

Furthermore, it is estimated that by 2030 the number of people who died from a heart attack or stroke will reach 23.3 million (2). In Europe, a significant

percentage of these deaths occur in young population, with a current number of 800,000 deaths from cardiovascular disease among young people, ischemic heart disease itself accounting for 330,000 of these deaths. Romania does not deviate from these troubling numbers, with cardiovascular disease representing the leading cause of mortality in the population aged <65 years. (1.3)

The cost derived from cardiovascular diseases in the European Union is estimated at 186 billion Euros/year. Of the total cost, 54% represent medical costs, 24% productivity losses and 22% informal care of people with ischemic heart disease. Romania and the entire Eastern European area recorded the highest costs. (3)

In this epidemiologic context, the prevention strategies aimed to control the cardiovascular risk factors and the adherence of the population to a healthy lifestyle (diet, physical activity, smoking cessation - active or passive) are a priority, considering their application anticipatory to a significant decrease in cardiovascular morbidity and mortality.

A lifestyle analysis, carried out over an extensive period of time (1970-2007), reveals serious food deficiencies in the Romanian population. Although it almost doubled its value (83 g fruit/day /person in 1970 to 1974 in 159 g fruit / day / person in 2007), fruit consumption stands at the bottom of the list in comparison to the developed countries of Europe. The same situation is found in vegetable consumption (289 g vegetables/day/person in 1970 to 1974, with a peak in 2003-2004 - 545 g vegetables/day/person, with progressive decrease until 2007- 413 g vegetables/day/person). Similar tendencies are observed across the entire Eastern European region, apparently explained by the status of developing countries and by socio-cultural habits. (3)

The proportion of dietary calories of lipid origin had an upward slope (23% in the period 1970-1974, 28% in 2005-2007) as well as the total number of calories. (3)

Moreover, epidemiological studies draw an alarm on the increasing frequency of cardiovascular disease among young people, as well as on the fact that increased incidence of ischemic heart disease in young population is expected in the next years.

However, recently published studies (10, 11, 12, 17) show that the adherence to a healthy lifestyle or a Mediterranean diet, along with regular exercise and smoking cessation is associated with a significant decrease in hospitalizations and mortality due to cardiovascular disease, having a convenient cost-benefit ratio.

In EU, standardized prevention programs are stipulated in national programs, the cardiac rehabilitation programs being integrated in the mandatory post infarction therapy. In Romania, these are only at a pioneering stage.

The achievements of some EU countries shows that some methods can be successful, but active cooperation of both of the involved groups is required (meaning doctors, physiotherapists, dieticians, government and financial specialists, medical insurance companies, food industry, media). (1, 2)

In 2009, the Romanian Society of Cardiology released a Cardiovascular Disease Prevention Program that will be reflected in the future years in order to meet the objective outlined in the European Health Charter: “Every newborn child is entitled to live up at least until the age of 65 years without suffering from a cardiovascular disease that can be prevented.” Within the results obtained from the completion of this project, we hope to help achieve this goal. (8)

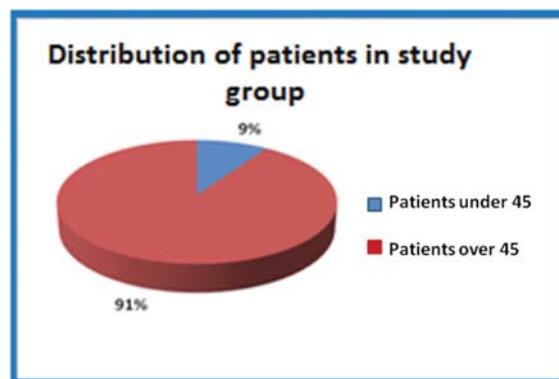
PERSONAL STUDY

Demographic data

Young patients with Acute Myocardial Infarction (AMI) represent 9.26% of all hospitalized patients, according to literature (frequencies between 4% and 10%). In the RO-STEMI registry, whose data were subsequently published outlining our results, 8% of patients were younger than 45 years. (5, 8, 9)

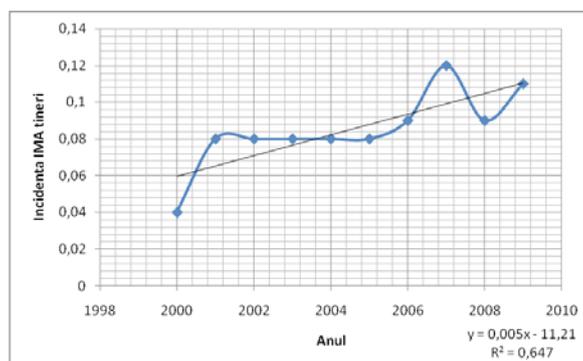
Patients distribution included in the study (9)

Fig 1



The evolution of the incidence of AMI in young people (2000-2010) (9)

Fig 2



The average age in the study group was 39 years and 5 months, with a median of 41 years (age limits: 19-45 years). In the control group the average age was 66 years and 9 months, with a median of 68 years. In the RO-STEMI registry, the average age of patients was 63.39 +/- 12 years with a median of 63 years, similar data with registers of Euro Heart Survey. A very interesting aspect pointed by the RO-STEMI registry is the directly proportional relationship between the age of onset of ACS and the GDP per capita. (5)

Temporal Distribution

Following the time evolution of the incidence of patients with AMI in the period 2000 - 2010 we notice a worrying increase statistically significant ($p < 0.05$) of it in the second half of the analyzed period.

Traditional cardiovascular risk factors

Traditional cardiovascular risk factors in the study group (9)

Table 1

	Smoking	Essential hypertension	Diabetes mellitus	Dyslipidemia	Obesity	Family history
Risk factors in young adults	107	39	21	75	48	34
Percentage	87,70%	31,97%	17,21%	61,48%	39,34%	47,89%

Prevalence of traditional cardiovascular risk factors in the control group (9)

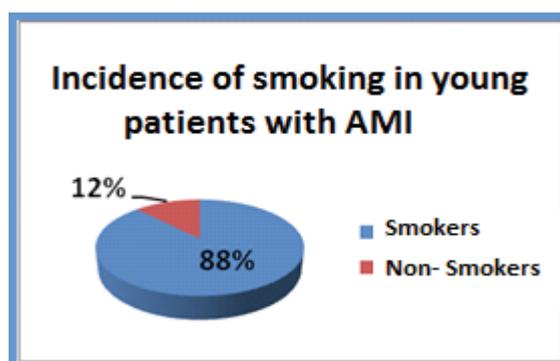
Table 2

	Smoking	Essential hypertension	Diabetes mellitus	Dyslipidemia	Obesity	Family history
Risk factors in elderly population	483	705	392	555	387	252
Percentage	44,15%	64,44%	35,83%	50,73%	35,37%	23,03%

The incidence of smoking in groups of young patients with AMI differs with statistical significance ($p < 0.0001$) than that found in the elderly patients (88 % vs 44 %). These data suggest not only the paramount role of smoking in the initiation of early atherosclerosis, but also the destabilization of atherosclerotic plaque in the initiation of intracoronary thrombosis. (14,15,16)

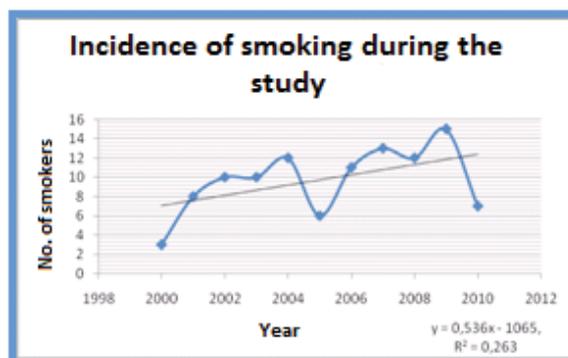
Incidence of smoking in young patients

Fig 3



The temporal frequency of smoking

Fig 4



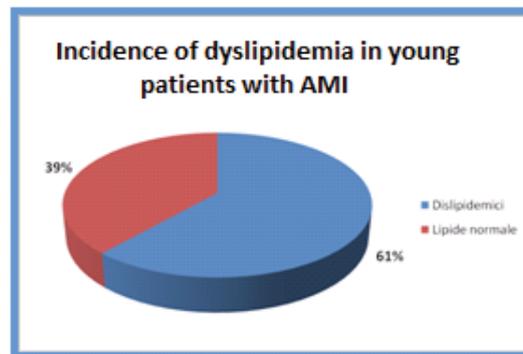
In contrast to European and American data records showing the decreased incidence of smoking in the last decade, in our study group we notice an increase in the number of smokers during the study, although not statistically significant (Figure 4, $y=0,536x-1065$). These results are however consistent with current epidemiological data showing a worrying increase in smoking among young people, but also young girls in Romania. (1, 2, 4, 9)

In the observational study group 75 (61.48 %) patients were diagnosed with dyslipidemia (Figure 5).

We notice a slight increase in patients with dyslipidemia during the study (Figure 6), but with low statistical significance ($r = 0.447$, $p < 0.0001$, $y=0,354x-704$), consistent with current epidemiological data showing an alarming increase dyslipidemia among young people in Romania, in conjunction with a low adherence to a healthy lifestyle (1, 2, 8, 9).

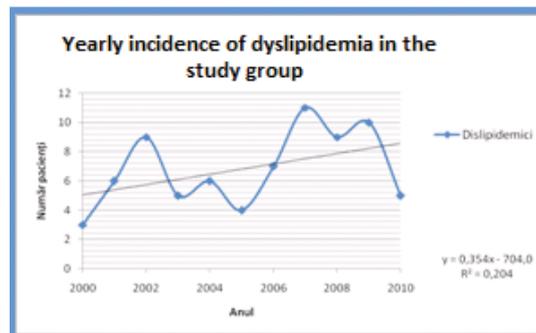
Frequency of dyslipidemia in young patients in the study group (9)

Fig 5



Evolution of dyslipidemia in young patients with AMI (9)

Fig 6

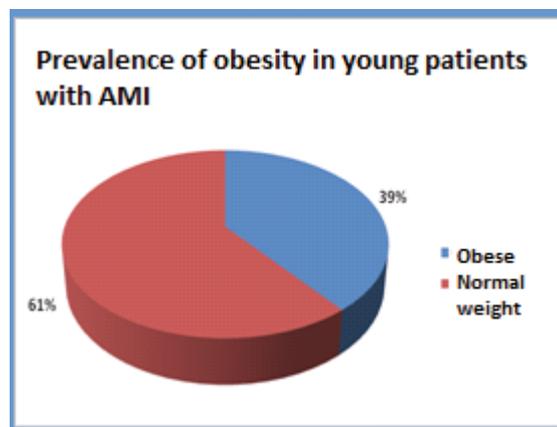


In the observational study group 48 patients (39.34%) were obese, all of them were men, probably due to cultural reasons (Figure 7).

We see an uneven distribution of this risk factor during the study, with a linear increase statistically significant ($r=0.398$, $p=0.006$, $y=0,254x-506$) (Figure 8). This aspect can be explained by patient lifestyle change (fast food diet, excessive alcohol consumption, sedentary).

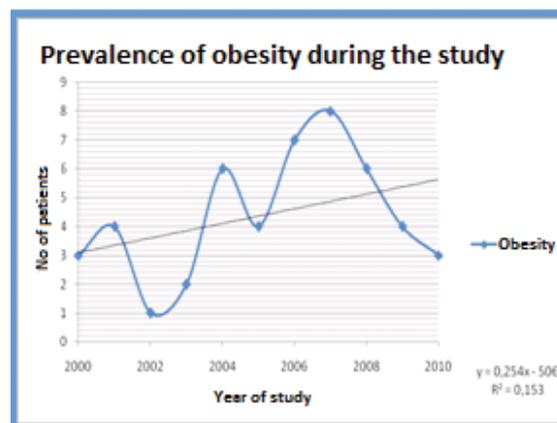
Prevalence of obesity in young patients with AMI

Fig 7



Prevalence of obesity during the study (9)

Fig 8

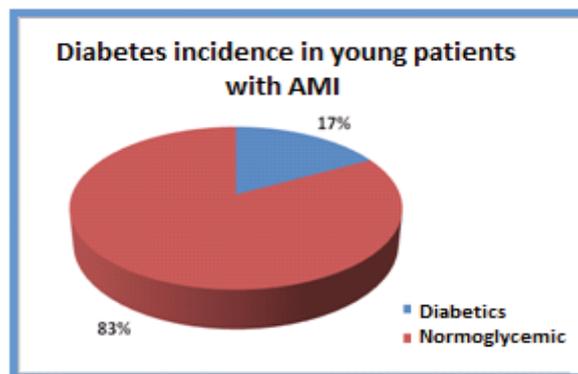


The statistical analysis of survey data shows that in patients with AMI, the association between obesity and dyslipidemia was highly significant in all study periods analyzed ($r=0.3538$, $p<0.0001$). (9)

High blood pressure and diabetes remain specific risk factors age related >45 years (fig. 9 and 10).

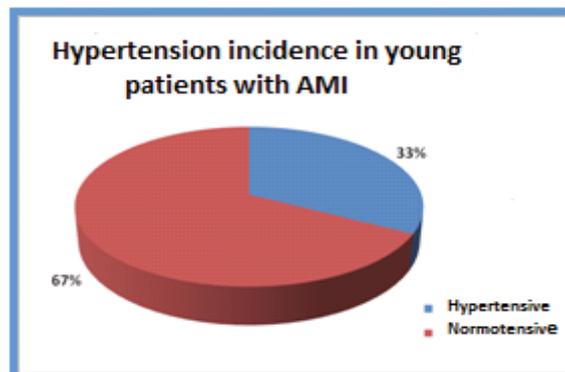
The frequency of hypertension in young

Fig 9



Frequency of diabetes in young patients

Fig 10



In correlation with these data, 70% of these patients at the beginning of the study were in a high-calorie diet, respectively, over 3000 kcal/day, and 63% of the patients did not practice any physical exercise (including walking, cycling, dancing, gardening).

Regarding adherence to the treatment in the first year post-MI, we found that 80% of patients had good compliance, especially in drug therapy,

patients have stopped smoking, met diet regimen, however, regular physical activity still remains a problem (lack of physical exercise persisted as a cardiovascular risk factor in many patients). After one year, less than 40% still followed the recommended regimen, 10% had resumed smoking, 45% remained or became obese, 7% abandoned any form of treatment and 99% of patients did not attend supervised cardiovascular rehabilitation programs. (9)

Conclusions

Numerous epidemiological studies indicate alarming prevalence of risk factors for coronary heart disease, leading to an increased incidence of coronary heart disease among young people. Romania seems to align with the global trends, the presented study results being indicative of this.

Although the incidence and prevalence of MI in young patients is small, this is associated with significant morbidity, with a strong psychological impact, and not least with significant costs. To our knowledge, in Romania there are few studies dedicated to this topic.

The most common cardiovascular risk factors are: smoking, dyslipidemia, obesity. Diabetes mellitus and hypertension remain risk factors specific for patients over 45 years. A significant number of young patients fulfilled the diagnostic criteria of metabolic syndrome.

Cigarette smoking is the dominant risk factor found in 88% of patients. An increase in the incidence of smoking during the study is noticed. Dyslipidemia and obesity show a linear increase in the last decade. A statistically significant association between obesity-dyslipidemia-hypertension-diabetes among young men with acute myocardial infarction is described. In correlation with these data, 70 % of patients enrolled in the study presented a high-calorie diet at the moment of enrollment (over 3000 kcal/day) and 63% of the patients did not practice physical exercise (including walking, cycling, dancing, gardening).

In conclusion, a worrying increase in young patients with AMI is noticed in recent years. The apparent causes are similar to those described in the elderly population, but their distribution is different. The main characteristic is an unhealthy lifestyle among youth: most of them are smokers, sedentary and have a high-calorie diet, with a significant percentage meeting the criteria for metabolic syndrome.

Given the fact that 80% of young patients with AMI have coronary atherosclerosis, there is an obvious need to understand the impact of cardiovascular risk factors in the young population and to refine methods of screening and primary prevention throughout which 90% of events can be prevented, especially if they are correctly applied starting from childhood. (15,18)

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