CORRELATIONS BETWEEN LIFESTYLE AND ISCHEMIC HEART DISEASE IN YOUNG PATIENTS

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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, diabetes mellitus.The present study is descriptive, longitudinal, ambispective: retrospective until 2004 and prospective for next 10 years, including all of the 122 patients consecutively admitted to the Cardiology Department of Bagdasar-Arseni Hospital, aged under 45 and diagnosed with AMI. These represented 9% of all patients with this diagnosis. Considering the time evolution, we can 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 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 - HTN- diabetes among young men with AMI is described. In correlation with these data, 70 % of patients enrolled in the study presented a high-calorie diet in the moment of enrollment, respectively, over 3000 kcal/day, and 63% of the patients did not practice physical exercise (including walking, cycling, dancing, gardening) (R. Ianula, 2012).In conclusion, a worrying increase in young patients with AMI is noticed in recent years. The apparent causes are similar to those described in an elderly population, but their distribution is different. The main characteristic is an unhealthy lifestyle among youth: the overwhelming majority are smokers, sedentary and have a high-calorie diet, with a significant percentage meeting 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

epidemiology of cardiovascular disease in Romania, traditional cardiovascular risk factors (diet, obesity, dyslipidemia, hypertension, diabetes, inactivity, smoking), myocardial infarction in young people.

Introduction

Cardiovascular disease is the most frequently encountered mortality reason, being responsible for approximately half of the total number of deceases. There are 4,35 million decease cases annually in Europe and 1,9 million patients are diagnosed with a

cardiovascular disease that induces disability and a decrease in life quality. (WHO 2013, ESC 2012; P Buckley 2013; Naska 2014)

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 in incidence 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.(Santulli 2013)

Even if there is no precise epidemiological information about Romanian cardiovascular disease incidence, we can estimate it considering the number of deaths caused by MI, which is increased comparing to other European countries: while Romania is registering an obvious MI incidence increase, in West European countries there is a 50 % decrease at the culmination time. (RO-STEMI, 2009)

The correlation between cardiovascular diseases and a number of risk factors like arterial hypertension, dyslipidemia, diabetes, obesity, smoking, sedentarity, stress, eating behavior 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 taken in discovering the real frequency of these disease, the prevalence of the associated risk factors and local factors, specific for the country, which will allow a better use of the resources of the health system for programs focusing on prevention. (Buckley, 2014)

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 of this subject in Romania.

Objectives: From this point of view, the study aims to analyze the correlation between the 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 methods and techniques of the study: The present study is descriptive, longitudinal, ambispective: retrospective until 2004 and prospective for next 10 years, including all of the 122 patients consecutively admitted to the Cardiology Department of Bagdasar-Arseni Hospital, aged under 45 and diagnosed with AMI.44 patients were retrospectively analyzed and 78 were prospectively analyzed. Information was collected from anamnesis, from the observation sheets, as well as questionnaires regarding to the lifestyle of the patient. The study group consisted of 1195 patients aged over 45, fulfilling the same diagnostic criteria. In order to make a more accurate longitudinal investigation in order to characterize the dynamics of the studied phenomena, we divided the research time interval into years, starting from January 2000 and ending in 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 in Excel. Data were collected from patient history, observation of records and data on morbidity and mortality retrospective, from scheduled visits or telephone interviews.

All the determinations were made using similar techniques. Statistical data were systemized in the form of synoptic charts (groups), their graphic representation achieved being made in the form of pie-charts, columns and curves of incidence. In order to classify and process, we used Microsoft Access and Excel databases. For statistical analysis we used the usual statistical tests in Microsoft Excel version 2010 and SPSS version 19. We made Pearson correlation statistics and statistical tests like chi^2, Fisher, etc. The results were presented as proportions, mean standard deviation and medians. We used the "t-test" for comparing mean values and "chi" square test for comparing proportions.

1. Literature Review:

Mortality due to cardiovascular diseases has recorded 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 in the same year. This tendency has been exceeded only by Bulgaria, Ukraine and especially the countries of the former Soviet Union (P Buckley 2013; Naska 2014; Santulli 2013).

Furthermore, it is estimated that by 2030 the number of people who died of a heart attack or stroke will reach 23.3 million (P Buckley 2014). 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 being cited as the cause of 330,000 of these deaths. Romania does not deviate from these troubling numbers, with cardiovascular disease representing the leading cause of mortality in population aged <65 years. (WHO 2013, ESC 2012, Mathers CD 2005)

The cost derived from cardiovascular diseases in the EU economy is estimated at 186 billion / year. Of the total cost, 54% is medical costs, productivity losses 24%, 22% informal care of people with ischemic heart disease. Romania and the entire Eastern European area recorded the highest costs. (ESC 2012)

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, their application is anticipating significant decrease in morbidity/cardiovascular mortality. (Naska 2014)

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 end 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. (ESC 2012)

As well as this, 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. (ESC 2012)

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 (M Bertoia 2014; Huang 2014; Yusuf 2004) 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 mortality due to cardiovascular disease, hospitalizations, 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 the methods can be successful, but active cooperation of both of the involved groups is required (that means doctors, physiotherapists, dieticians, government, financial specialists, medical insurance, food industry, media) (WHO 2013; ESC 2012).

In 2009, the Romanian Society of Cardiology released a Cardiovascular Disease Prevention Program that will be reflected in the future years so as 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. (C Ginghina 2010)

Demographic Data

Young patients with Acute Myocardial Infarction (AMI) represent 9.26% of all hospitalized patients, according to literature data showing the frequency between 4% and 10%. The RO-STEMI registry, whose data were subsequently published outlining our results, 8% of patients were younger than 45 years (Ro-STEMI 2009; R. Ianula 2012; McManus 2011).
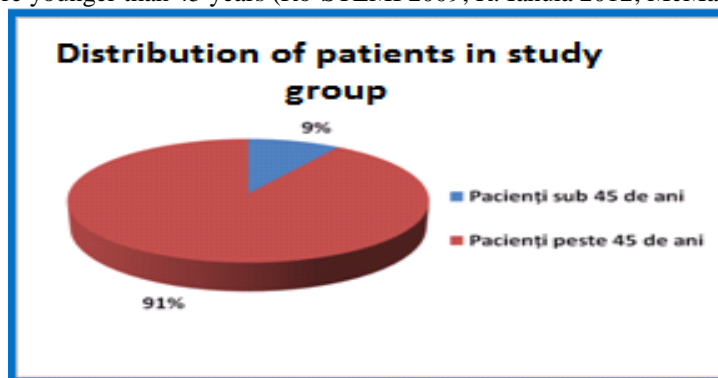

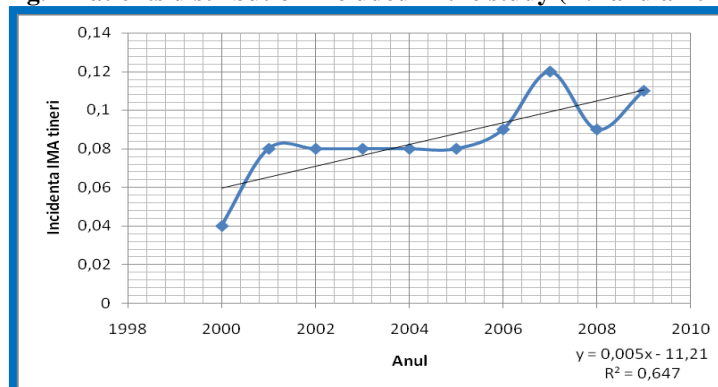**Fig. 1 Patients distribution included in the study (R. Ianula 2012)**

Fig. 2 The evolution of the incidence of AMI in young people (2000-2010)
(R. Ianula 2012)

The average age in the study group was 39 years and 5 months, with a median of 41 years (age limit: 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 the directly proportional relationship between the age of onset of ACS and the GDP per capita. (Hasdai, 2002, Ro-STEMI 2009)

Temporary 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.

2.2 Traditional cardiovascular risk factors

Table 1 Traditional cardiovascular risk factors in the study group (9)

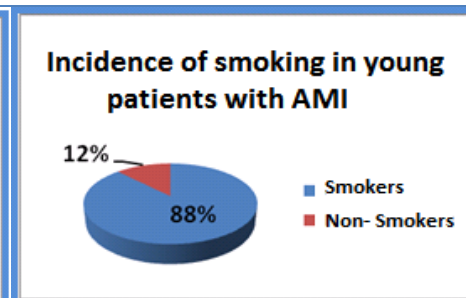|	Smoking	Essential hypertension	Diabetes mellitus	Dyslipidemia	Obesity	Family history
Risk factors in young adults	107	39	21	75	48	34
Percentage	87,70%	31,97%	17,21%	61,48%	39,34%	47,89%

Table 2: Traditional cardiovascular risk factors in the control group (R. Ianula 2012)

	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%
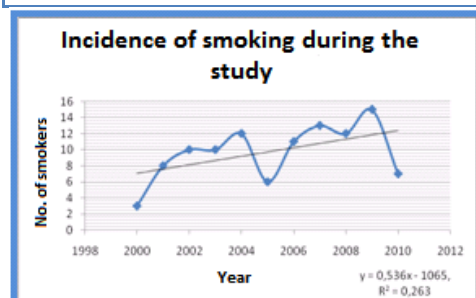
With AMI (R.Ianula 2012)

Fig.3 Incidence of smoking in young patients **Fig.4 The temporal frequency of smoking**

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. (McManus, 2011; Yater, 2010; Khawaja, 2011)

In contrast to European and American data records showing the decreased incidence of smoking in the last decade, in the study group we notice an increase in the number of smokers during the study, although not statistically significant (Figure 4). These results are however consistent with current epidemiological data showing a worrying increase in smoking among young people, but also young girls in Romania (ESC 2012; Buckley, 2014; Santulli, 2013; Ianula, 2012)
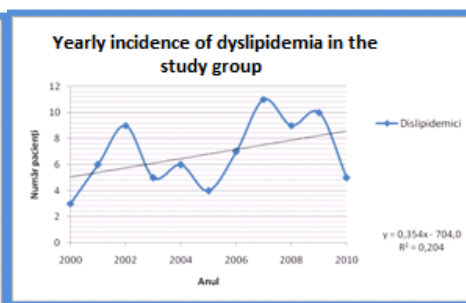
In the observational study group 75 (61.48 %) patients were diagnosed with dyslipidemia (figure 5).

We notice a slight increase in patients with dyslipidemia during the study (Figure 6), but with a very high statistical significance (r = 0.447, p < 0.0001), 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 (ESC 2012; Buckley; and Ginghina, 2010; Ianula, 2012).
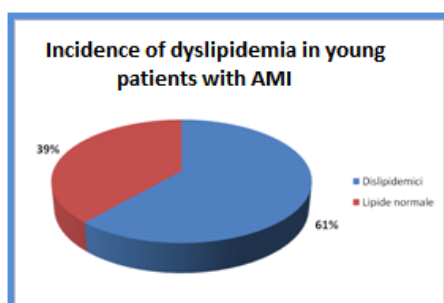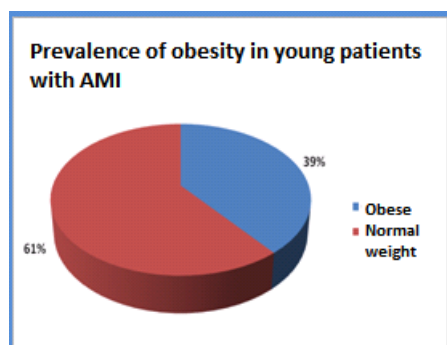

with AMI (R. Ianula 2012)
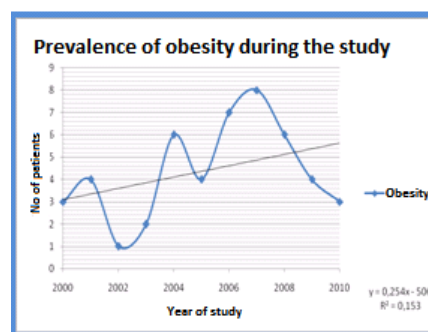
Fig.5 Frequency of dyslipidemia in young patients

studied group (Ianula 2012).

Fig.6 Evolution of dyslipidemia in recemt

with AMI (R. Ianula 2012)

Fig.7 The frequency of obesity in young patients
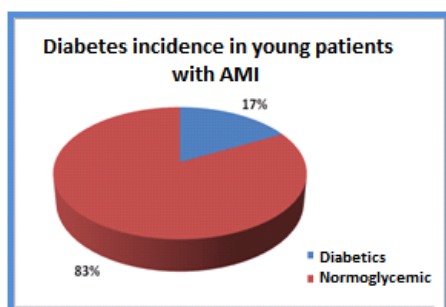
studied group (Ianula 2012).

Fig.8 Frequency of obesity during the study

In the observational study group 48 patients (39.34 %) were obese, all of them were men, probably for 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) (figure 8). This aspect can be explained by lifestyle modification of the patients (fast food diet, excessive alcohol consumption, sedentary).

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). (R. Ianula 2012)

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

with AMI (R. Ianula 2012)
Fig.9 The frequency of hypertension in young patients
Figure 9:   **Figure 10:**
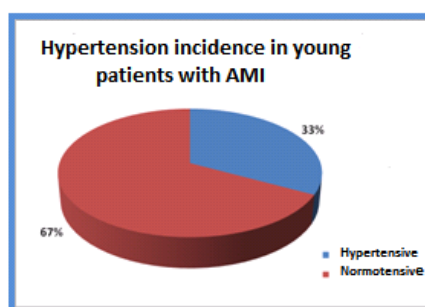
studied group (Ianula 2012).
Fig.8 Frequency of diabetes in young patients

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, meets diet regimen, regular physical activity, however, still remains a problem, lack of physical exercise persisted as a cardiovascular risk factor in many patients. After one year, however, less than 40%) follow the recommended regimen, 10% had resumed smoking, 45% remain or become obese, 7% have abandoned any form of treatment and 99% of patients did not attend rehabilitation programs supervised cardiovascular (R. Ianula 2012).

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, it 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 - HTN- diabetes among young men with AMI is described. In correlation with these data, 70 % of patients enrolled in the study presented a high-calorie diet in the moment of enrollment, respectively, 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 an elderly population, but their distribution is different. The main characteristic is an unhealthy lifestyle among youth: the overwhelming majority are smokers, sedentary and have a high-calorie diet, with a significant percentage meeting the criteria of 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 since childhood. (Yusuf S 2004;)

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