Quantitative techniques used for analyzing the geographical particularities of patients with acute coronary syndromes

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Abstract

A priority of medical university education is that to train students to work on completing their studies in university research departments of medicine or university hospitals. The aim of this work was to provide students from several universities of medicine methods used to analyze geographic features of patients with acute myocardial infarction hospitalized in different regions of Romania. We made up groups of students from the fourth year of study from five medical universities. We chose students from the fourth year of study because the cardiology module is included in the curricula of this academic year. Each of these groups was guided by a teacher of the Department of Cardiology. At each university we made up a database pursuing the same variables related to: demographic data, the mode of the addressability of patients in hospital, the time for presentation to the hospital compared to the time of onset of symptoms, investigations performed, types of treatment administered, evolution and complications. Data centralization was done in a database in SPSS and we used statistical methods for data processing. The interrelation between students of several universities made it possible to create a national database and presentation of results is a step leading up to the development of national registers of study of various medical conditions.

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Keywords: medical statistics, cardiology, quantitative analysis, acute coronary syndromes;

1. Introduction

In Western and Central European countries, over the past 20 years, mortality declined, reaching a few years ago at 3 deaths per 1000 inhabitants. In Romania, however, there was an increase of the mortality caused by cardiovascular diseases, which, three years ago, was about 10 deaths per 1000 inhabitants. A higher mortality than this record for the same period of time was registered in the former Soviet Union countries, Bulgaria and Albania. Among cardiovascular diseases, the highest rate of mortality has the ischemic coronary heart disease. Part of this entity is also the acute myocardial infarction.

Collecting these data was made using sources provided by international databases, MEDSCAPE and specialized publications. The data underlying these sources are, actually, the national statistical records of several countries. These records are, in fact, the link between international clinical trials and daily clinical practice. The comparison of

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the results of randomized clinical trials and provided data reported in the national medical records offers, from a health perspective, a better vision of the composition of these databases.

Based on these findings we have discussed and developed with students the present paper. In agreement, we decided that it is important to know how to integrate in real life the medical practice information provided by clinical studies.

The work was carried out by the fourth year students from the medical faculties of several universities in Romania, under the direct guidance of teachers from the Department of Cardiology. One of the priorities of medical higher education is to prepare the students that will work after completing their studies in the research departments of universities hospitals or in the Universities of Medicine from Romania.

2. The goal of the paper

Through this paper we proposed to study geographical features of patients hospitalized for acute myocardial infarction in several hospitals from Romania. We also wanted to make a comparison of the same variables to those reported in randomized international clinical trials and with those published by national medical records of different countries.

3. Method

In order to realize the study were built groups of ten students in four medical universities from Romania who have made many databases that included several variables previously set by mutual agreement. Data were collected from several hospitals that are situated both in university towns and in neighboring localities. Tracked variables were: patient identification data, demographic data, risk factors for ischemic coronary artery disease, myocardial infarction location on ECG, addressing mode of the patient to the hospital, symptoms, time of patient presentation to the hospital from the time of onset of symptoms, duration of time between hospital presentation and the initiation of treatment, hospital treatment, evolution, complications and mortality.

Patients’ inclusion in the study was done according to current criteria used for the definition of myocardial infarction, namely:

- clinic: chest pain or precordial pain, lasting more than 20 minutes, which does not respond to nitroglycerin, irradiated back / upper limb on the left / to the neck;
- electrocardiogram: ST segment elevation ≥ 0.2 mV in V2-V6 and /or ≥ 0.1 mV in DII, DIII, aVF;
- biological: increase tropopnine T or I and / or myoglobin and / or CK-MB to values according to current guidelines.

For easier handling of the database were established common symbols for the tracked variables. Data were centralized by a particular group of students from the Faculty of Medicine, University of Medicine and Pharmacy from Bucharest. Data collection was performed at the level of each university during a period of eight months. Their centralization in Bucharest was made monthly. We nominated two students that checked every month, independently one of each other, these data. Independent verification has been made in order to eliminate any mistakes. Were checked both the quality of data and the accuracy of completing the fields. Statistical data processing was done using SPSS software.

4. Results

The four Universities of Medicine that reported data were actually from the four geographical regions of Romania: Muntenia (which included the capital, Bucharest), Transylvania, Banat and Moldova. Patients who have addressed the university hospitals were residents of that city and of neighboring villages. Medical centers from Bucharest represented 32% of all hospitals included in the study. Data collected in the region of Moldova represented 27%, 24% were from Transylvania and 17% from Banat.
The average age of patients was initially calculated for each of the four databases. We also calculated the average age of the entire group of patients, centralizing data from all four geographic regions. This was 65.4 ± 8 years. The average age of women was 7 years older than men. The entire group consisted of 1257 patients. We noticed that the average age of occurrence of acute myocardial infarction was directly related to the degree of socio-economic development of the geographical region where the patients belong. The lowest average age of a heart attack was registered in Moldova, followed by Muntenia, Transylvania and Banat.

Regarding distribution by sex, myocardial infarction was recorded for 61% men and 39% women.

The most common risk factor in producing acute myocardial infarction was found to be high blood pressure (recorded at 57.2% patients). Smoking was recorded as a risk factor for 43.2% of patients. Other risk factors detected were: dyslipidemia (37.6% patients), diabetes (27.4% patients), obesity (23.7% patients) and history of another heart attack (8.3% patients). As a geographic feature, we found that hypertension is as common in all four regions of the country, in exchange, diabetes is more common in Muntenia and Banat, and dyslipidemia in the same two regions. Obesity was the most common in Muntenia. Dyslipidemia was more frequently recorded in Moldova. These peculiarities of risk factors distribution are explained by eating habits, lifestyle and economic development level of each of these regions.

We found that smoking is more common until the age of 65 years in all regions except Muntenia, which has the same incidence and after this age. The most common location of myocardial infarction was seen on the anterior wall of the heart (53.7%) for patients from all four regions.

Another observed variable was the duration of follow-up time between symptom onset and hospital admission of the patients. In the central group, 28.7% of patients were admitted within three hours of onset of symptoms, 31.4% between 3-6 hours, 17.8% between 6 to 12 hours the rest after 12 or 24 hours from the onset of symptoms. Given that over 50% of patients were presented to hospital within 6 hours, the optimal treatment with current European guidelines could be used. By customizing according to geographic region we found that, regardless of region, the highest number of patients presented at the hospital within 6 hours was recorded for those living in university towns. For patients located in villages around these cities the time between the onset of symptoms until hospitalization was more than 8 hours. This made that a fairly large number of patients could not receive the optimal treatment. The explanation of this phenomenon is given by several existing situations: lack of proper infrastructure of roads linking the satellite city where the patient is admitted, the absence of telemedicine system between rural and urban areas, ignoring symptoms most common for patients from rural environment, poor medical facilities of the rural health units.

In terms of the length of time between patient admission and the onset of thrombolytic therapy were not registered significant differences between different geographical regions. In agreement with the European Society of Cardiology guidelines in all university hospitals from all geographic regions of the country, the initiation of thrombolytic treatment was done as recommended in the guidelines. It was noted that in university hospitals from the western county, Banat, myocardial infarction was treated by interventional cardiologists (Interventional therapy) and not by medication. This strategy can be explained by the existence of a close collaboration between the hospitals and those from Western Europe, where this type of treatment is preferred. The superiority of this type of treatment is given by the increased healing rate of myocardial necrosis and the economic reasons (lower hospital costs through lower time of hospitalization). In terms of other adjuvant drugs included in the based treatment there were no differences between university hospitals from the four geographic regions and even between the rural regions. Differences were recorded between university and rural hospitals. The explanation of this phenomenon is the weaker technical equipment of hospitals in rural areas and the absence of qualified medical personnel in hospitals similar to the university ones.

Evolution and complications were determined mainly by the type of treatment given rather than the geographic region of origin of the patients.

Global hospital mortality was 12.3%. Mortality in the four areas of university hospitals was similar. However, we noted a slightly lower percentage of mortality recorded in the hospitals from the capital, but without statistical significance. Mortality was reduced as patients were younger and the time between hospitalization and treatment...
was lower. Also, another factor that influenced mortality was the severity of symptoms after the admission of the patient.

5. Conclusions and discussions

The interrelation between students of several universities made possible to create a national database. The comparison of the results with those published in international medical literature made possible to extract important medical information and to organize workshops to discuss these results.

Some of the conclusions drawn by medical students are:

- in Romania, smoking is a risk factor present in much higher percentage than in Western and Central Europe;
- dyslipidemia incidence is much higher in Romania than in other countries included in our comparison, even though the percentage of obese or diabetic patients is similar;
- the proportion of patients with high blood pressure is slightly higher in Romania, but this increase has no statistical significance;
- the number of women with acute myocardial infarction is lower than men, but still remains higher than in these countries;
- a thrombolytic therapy is administered in a smaller percentage in Romania, although in Western and Central European countries the Interventional treatment procedures have priority. This shows that the length of time during which the patient reaches the hospital in these countries is much lower (<90 minutes). This is possible by the existence of a well developed infrastructure and the widespread use of telemedicine;
- global mortality resulting from this study remains twice as high for Romania, although it’s noted a reduction during the last ten years;
- the remaining issues studied in terms of the age of a heart attack, risk factors (other than those listed above), the traditional medications used during hospital complications, the results from the database created by the students are super imposable over those published in international medical literature.

The achievement of this work showed students the importance of comparative studies, highlighted the geographical features of certain aspects of medical care, created the basis for discussion between students and showed them the importance of developing their national health registries.

Acknowledgements

This work was supported by CNCSIS – UEFISCDI, project number PNII – IDEI code 1793/2008, financing contract no. 862/2009.

References


