ENZYMATIC SPECIFICITY OF CORONARIAN SYNDROMES IN ELDERLY PATIENTS

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ABSTRACT

The leading causes of death among the elderly are cardiovascular disease, followed by cerebrovascular and psychiatric diseases. Our study included patients aged between 65 and 84 years, hospitalized between 2012 and 2014 and selected based on the presence of the acute coronary syndrome, and for whom the myocardial enzymes and molecular markers specific to cardiac infarction (CK - creatine phosphokinase, CKMB - creatinekinase MB isoenzyme, and troponin) were determined. The statistical analysis of the study data showed that the elderly patient’s symptomatology is atypical if compared with the adult’s, being characterized by an increase in myocardial infarction enzymes in only 24% of the anatomo-pathologically confirmed cases.

Key words: coronary syndrome, elderly, CK, CKMB, troponin.

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Introduction

One reason why in geriatric clinics cardiovascular morbidity is central is because cardiovascular disease (CVD) is the main reason for applying for ambulatory (outpatient) or hospital (inpatient) care. Thus, 55% of men and 45% of women aged over 65 have CVD.[1] Unlike in adult patients, the category of heart affections in the elderly involves morpho-functional modifications of the age-related physiological involution combined with pathological changes the prevalence of which increases with age, influencing each other, with involutive changes triggering the aggravation of pathological phenomena, which, in their turn, exacerbate involution.

The senile heart is the morpho-functional substrate of normal involution. It expresses the functional optimum of elderly patients, determined by clinical and laboratory criteria leading to a clinical attitude characterised by early prophylactic measures and the acquiring of a methodology specific to the eldercare, and indicators of age, genetic and environmental factors, all of which eventually shaping specific criteria for each patient[2-4].

The peculiarities of physiological involution become increasingly apparent with age. Up to 55-60 years of age, the heart has enough adaptive availability; after that, though blood pressure increases, the compensatory response of the heart is missing[5-7]. In the same time, the occurrence of subepicardial adipose tissue, particularly around subepicardial coronary vessels, increases. The pericardium does not atrophy with age, ensuring the same mobility both in adults and the elderly, but a certain rigidization becomes manifest through the degenerative processes of the elastic and collagenous fibers; also there is a thickening of the pericardium in the parietal region of the cavities at the mitral and aortic valves.

Old age cardiovascular physiological indicators reflect the relationship in the functional assembly heart-circulatory system[8,9]. The heart finds it difficult to face additional tasks, the adaptability to effort decreases, the ventricular contraction function significantly reduces between 75-85 years, and
so do the flow/minute, the speed and the volume of blood supply\textsuperscript{10,11}.

Ischemic cardiomyopathy is one of the greatest issues in geriatrics. It is a manifestation of atherosclerosis, an ischemic condition of the myocardium through coronaropathy. The ischemic heart disease can cause a partial necrosis of the myocardium, in which case myocardial infarction occurs\textsuperscript{12-13}. This condition in the elderly presents some particular characteristics when compared to the clinical picture of coronary accidents in young people and adults. These particulars regard the diagnosis (disease onset, clinical symptomatology), evolution, complications, prognosis, and mortality. Coronary accidents in the elderly occur and develop in a different morpho-functional context than that of young people or adults, being related to the complex process of physiological senescence with subsequent changes and the associated age-related pathology\textsuperscript{14}.

Materials and methods

The study was conducted on a group of 20 patients aged between 65 and 84 years, admitted and treated in the Department of Geriatrics, “Sf. Apostol Andrei” Clinical Emergency County Hospital in Galati, between 2012 and 2014. The patients were selected based on the clinical picture of acute coronary syndrome. The Department of Geriatrics is a chronic disease service for comorbidities other than acute coronary disease (sleep disorders, depression, degenerative osteoarthritis, etc.). The small number of patients with acute coronary syndrome is due to the fact that, during their hospitalization in the Geriatrics ward, they either had an acute myocardial infarction or unstable angina and were transferred to the Cardiology ward equipped for ICT, where were treated accordingly.

The study method chosen was the determination of myocardial enzymes and molecular markers specific to cardiac infarction (CK, CKMB, troponin) and of unspecific tests for cardiac infarction (GOT - glutamic oxaloacetic transaminase, GPT - glutamic pyruvic transaminase, LDH - lactate dehydrogenase, and C-reactive protein increase).

2. Preliminary data

Cardiovascular diseases in the elderly has an important share of all cases of disease, with important implications in the evolution of other debilitating conditions that lead to the loss of autonomy in the old. Among cardiovascular diseases, acute coronary artery disease is associated with increased rates of mortality and morbidity.

The present clinical-statistical study aims to emphasize particular aspects as many as possible cardiovascular diseases in the elderly, especially the acute coronary syndrome, namely: gender and age of patients, place of residence (urban or rural), enzymatic specificity, disease severity, influence of associated diseases on the evolution of cardiovascular affections.

The statistical method used was the statistical software SPSS 1.1.1.

Results

The analysis of statistical data showed equal distribution between the genders (Figure 1).

\begin{center}
\includegraphics[width=0.5\textwidth]{Figure1.png}
\end{center}

Figure 1: Distribution of patients by sex.

There are more urban than rural patients (Figure 2).

\begin{center}
\includegraphics[width=0.5\textwidth]{Figure2.png}
\end{center}

Figure 2: Distribution of patients by place of residence.

There are more patients in the 65-74 age group (Figure 3).

It is known that most elderly patients with cardiovascular disease also have associated diseases (comorbidities) (Alzheimer's disease, diabetes, hypertension, dyslipidemia, stroke sequelae, chronic obstructive pulmonary disease) causing most often
than not an exacerbation of the disease and requiring hospitalization. The presence of other affections concomitant with cardiovascular disease, lead, especially in elderly patients, to a worsening of their health, the adoption of new treatment conduct, all in all, to high hospitalized mortality (Figure 4).

The onset manifested either through sudden acute dispnoea, or a confusional state, or a syncopal attack. Another clinical specificity is that the acute myocardial infarction may aggravate a pre-existing congestive heart failure (Figure 5).

In statistical terms, data analysis showed that, in the early days of the onset of the acute coronary disease, in 85% of patients, the results of nonspecific tests are increased (GOT - glutamic oxaloacetic transaminase, GPT - glutamic pyruvic transaminase, LDH - lactate dehydrogenase, and C-reactive protein increase).

Myocardial enzymes and molecular markers specific of cardiac infarction (CK - creatine phosphokinase, CKMB - creatinekinase MB isoenzyme, troponins) were high in only 15% of the patients tested and only after 2-3 days since onset (Tables 1 and 2).

Regarding the evolution in the studied group, we found that in patients aged over 65 the evolution entails severe complications such as: congestive heart failure, hypotension, cardiogenic shock, residual angina pectoris, extracardiac complications.

### Table 1: Enzymatic specificities.

<table>
<thead>
<tr>
<th>Total no. of patients</th>
<th>GOT glutamic oxaloacetic transaminase</th>
<th>GPT glutamic pyruvic transaminase</th>
<th>LDH lactate dehydrogenase</th>
<th>C-reactive protein</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>result interval</td>
<td>result interval</td>
<td>result interval</td>
<td>result interval</td>
</tr>
<tr>
<td>17</td>
<td>182u/l 0-37u/l</td>
<td>87u/l 0-40u/l</td>
<td>535u/l 120-240 u/l</td>
<td>positive</td>
</tr>
</tbody>
</table>

### Table 2: Myocardial enzymes specific to cardiac infarction.

<table>
<thead>
<tr>
<th>Total no. of patients</th>
<th>CPK creatine phosphokinase</th>
<th>CKMB creatinekinase - MB isoenzyme</th>
<th>Troponin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>result interval</td>
<td>result interval</td>
<td>result interval</td>
</tr>
<tr>
<td>3</td>
<td>283 u/l 24-204 u/l</td>
<td>32 u/l 0.20-16 u/l</td>
<td>&lt; 20 u/l</td>
</tr>
</tbody>
</table>

Figure 3: Distribution of patients by age.

Figure 4: Comorbidities in patients under study.

Figure 5: Graphic representation of clinical onset.

Figure 6: Distribution of patients by complications.

Figure 7: Graphic representation of patients who died while under study.
The action of locating the acute myocardial infarction in the patients included in the study is distinguished mainly by the previous one, which usually predisposes to arrhythmias, especially atrial fibrillation (Figure 6).

In general, in-hospital morbidity in elderly patients is almost the double of that in adult patients, being produced by the following complications: cardiogenic shock, congestive heart failure, arrhythmias and heart break (Figure 7).

As a consequence of complications, three persons out of the 20 in the study group died.

Discussion

Statistic data show that in the group under study gender distribution is equal after 60 years of age.

The incidence is higher in patients from urban areas, with a high frequency in the 65-74 age group.

The symptomatology is different from that of adult patients and atypical, making it harder to diagnose the disease. The classical diagnostic triad (pain, ECG changes and increased cardiac enzymes and makers for myocardial necrosis) is found only in 24% of cases anatomo-pathologically confirmed.

In patients aged over 65, the evolution entails severe complications such as: congestive heart failure, hypotension, cardiogenic shock, residual angina pectoris, extracardiac complications.

There is specificity in the elderly, mainly in terms of the enzymatic profile of acute coronary syndromes.

The clinical-evolutionary differences between the manifestation and the evolution of myocardial infarction in the elderly and the adults are based on these changes specific to senescence and on the specific pathology accompanying the structure and functionality of the cardiovascular system, primarily of the heart. In an elderly patient, the physiological changes of the heart will maintain its satisfactory functionality only under normal circumstances, but not quite so when an additional task appears because the adaptability to effort is diminished by the lowering of the threshold when dyspnoea develops (15).

True incidence of acute myocardial infarction in the elderly is difficult to determine. Because of diagnostic difficulties, a significant number of heart attacks in elderly patients remain undiagnosed on grounds of atypical symptomatology (16,17).

A characteristic of acute myocardial infarction in the elderly is its increased incidence in elderly women (almost equal to those in men, or even predominant in very old age), this distribution being clearly different from that of myocardial infarction in youth and adults, where males predominate: 6:1 under 50 years, 2:1 over 50 years, 1:1 over 70 years, 1:2 more than 80 years.

Conclusion

Despite the fact that cardiovascular disease is a leading cause of mortality, decrease in its incidence and health improvement are possible if the patient is informed, educated for a healthy lifestyle and if they get to a doctor in an early stage of the evolution. Through treatment, counselling and monitoring, even the elderly over 60 can improve the quality of their life.

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