THE PREVALENCE OF MAJOR DEPRESSION IN THE PATIENTS WITH CORONARY HEART DISEASE

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Abstract: During the last 15 years, numerous studies were conducted for detecting the prevalence of depression in the patients with coronary artery disease. The reported rate of depression vary a lot from study to study because of the differences between patients' demographic characteristics, such as gender, age or the type of coronary artery disease, as well as because of the method used to assess depression. Also, the patients with silent ischemia, heart failure, ischemic cardiomiopathy or arrhythmias because of coronary artery disease were not included in the analysis, as well as the patients from the control group (formed usually by healthy subjects), who were not screened for silent ischemia. Aim: the aim of the study was to determine the prevalence and the severity of depression in the patients with ischemic heart disease and to check if there are some differences of the depression rate between the forms of ischemic cardiopathy. Method: the study was conducted on 231 patients with ischemic heart disease recently diagnosed. Depression was screened using the PHQ questionnaire with 2 items. This questionnaire was applied at the inclusion into the study and at intervals of 1 month. The presence of depression was confirmed by the psychiatrist. A comparison between the prevalence of depression was done by the forms of ischemic cardiopathy and by gender. Results: at the end of the study, depression was diagnosed in 33,8% of the patients (n=81). This was more frequently encountered in the patients with myocardial infarction (43,1%) and in the patients with ischemic cardiomiopathy (42,9%) and less in the patients with silent ischemia (21,7%) and stable angina (27,1%). Depression was more frequent in women but this appeared earlier in men (8,09± 5,65 month vs 5,59±4,87 month, p=0,03), who also presented more severe depression in comparison with women.

Cuvinte cheie: depresie, boală coronariană ishemică

Rezumat: Pe parcursul ultimilor 15 ani, numeroase studii au fost efectuate pentru a detecta prevalenţa depresiei la pacienţii cu boală coronariană. Rata de raportare a depresiei variază foarte mult de la studiu la studiu, din cauza diferenţelor dintre caracteristicile demografice, cum ar fi: sexul, vârsta sau tipul de boală coronariană, precum metodele folosite pentru evaluarea depresiei. De asemenea pacienţii cu cardiopatie ischemică din insuficienţa cardiacă, cardiomiopatia ischemică sau aritmii din cauza unei boli coronariene nu au fost incluşi în analize, precum şi pacienţii din grupul de control (subiecţi sănătoşi) care nu au fost diagnosticaţi cu ischemie silenţioasă. Scopul: Scopul studiului a fost de a determina prevalenţa şi severitatea depresiei la pacienţii cu boală cardiacă ischemică şi pentru a verifica dacă există unele diferenţe între rata depresiei în formele de cardiopatie ischemică. Metoda: Studiul a fost efectuat pe 231 de pacienţi cu boală cardiacă ischemică diagnosticaţi recent. Screeningul pentru depresie s-a efectuat utilizând chestionarul PHQ-2 cu 2 itemi. Acest chestionar a fost aplicat la includerea în studiu şi la intervale de 1 lună. Prezenţa depresiei a fost confirmată de medicul psihiatru. A fost făcută o comparaţie între prevalenţa depresiei, în formele de cardiopatie ischemică şi sex. Rezultate: La sfârşitul studiului depresiei a fost diagnosticată la 33,8% dintre pacienţi (n = 81). Acest lucru a fost mai frecvent la pacienţii cu infarct miocardic (43,1%) şi la pacienţii cu cardiomiopatie ischemică (42,9 %) şi mai puţin la pacienţii cu ischemie silenţioasă (21,7%) şi angină pectorală stabilă (27,1%). Depresia a fost mai frecventă la femei, dar aceasta a apărut mai devreme la bărbaţi (8,09 ± 5,65 vs 5,59 ± luni 4,87 luni, p = 0,03), care au prezentat de asemenea depresie mai severă în comparaţie cu femeile.

INTRODUCTION

In the last 15 years, there have been many studies on the prevalence of depression in the patients with coronary heart disease. The results reported that prevalence varies appreciably between 10% and 65%, depending on the form of ischemic heart disease patients that were included in the study. Regardless of prevalence, the presence of depression is significantly higher in the patients with ischemic heart disease compared with the general population, being generally between 20-30%. However, only 2 studies were identified that followed the prevalence of depression in patients with different manifestations of ischemic heart disease, the remaining studies were usually focused on one

form of ischemic heart disease (stable angina, unstable or myocardial infarction). There is more information in the literature on patients with ischemic cardiomyopathy, ischemic heart, silent ischemic, arrhythmias installed on the merits or ischemic heart failure, all manifestations of coronary heart disease.

Some studies have determined the prevalence of depression in forms of coronary artery disease using a single group of patients but they did not compare the rate of depression between groups. More, within the main group study, there were included patients with stable angina, unstable or myocardial infarction and patients who have undergone either PTCA with / without stenting or bypass. The latter are, however, therapeutic methods and forms of ischemic heart disease.

Another essential element that raises questions about the accuracy of the results provided by the literature is the absence of information on the prevalence of depression among the patients with silent coronary heart disease, group of patients who were not included in any of the studies conducted so far, regarding the subject mentioned. Moreover, not only that the patients with silent ischemia were not included in either analyses, but the witness group, usually consisted of healthy subjects, has not been investigated in order to exclude silent ischemia (exercise test, coronary angiography).

Besides the above-mentioned shortcomings, the differences between the reported prevalence of depression were significantly influenced by the diagnostic methods used or by the moment in which the screening for depression was performed.

Some studies used self-administered questionnaires, other combinations of questionnaires and structured interviews and self-administered questionnaires, others used assessments made by psychiatrists or trained personnel in this field. Comparing the results provided by the methods mentioned above, it is shown that the prevalence of depression was higher when using self-questionnaires.

In studies that assessed the presence and severity of depression after myocardial infarction, methods for screening and diagnosis of depression were applied 24 hours after the occurrence of cardiac events. Other studies have pursued the prevalence of depression in patients undergoing bypass surgery diagnostic methods applied pre-or postoperative depression.

The results suggest that the rate of depression is higher during hospitalization compared to the follow-up period, when the symptoms disappeared in most cases. Studies which tried to monitor the depressive symptoms at certain time intervals could not provide a specific development model. Therefore, the time when the tool should be used to diagnose depression remains unspecified.

In our country, there has not been any study to determine the prevalence of depression in the patients with coronary heart disease.

PURPOSE

The objective of the study was to determine the prevalence of depression in the patients with ischemic heart disease, 1 month after diagnosis and severity classification according to age, gender, type of heart disease and severity of myocardial ischemia. The study also aimed at determining the association between depression and various manifestations of coronary heart disease.

METHODS

The study included 231 patients diagnosed with various forms of ischemic heart disease (angina pectoris, stable or unstable, acute myocardial infarction, ischemic

cardiomyopathy, ischemic etiology of heart failure, arrhythmias installed on silent ischemic heart disease and ischemic fund). When heart failure or arrhythmias were diagnosed as a complication of myocardial infarction or ischemic cardiomyopathy, the patients were classified according to their primary diagnosis, i.e. patients with acute myocardial infarction or dilated cardiomyopathy. The patients were selected among the patients who are registered within the Cardiology Clinic of the Emergency County Hospital Oradea.

The patients' demographic characteristics were analysed, as well as the medical history, the date of onset of ischemic coronary disease and its treatment and the concomitant diseases. A previous history of depression and a family history of depression have been noted, and there have been identified the cardiovascular risk factors.

In all the selected subjects, the ejection fraction was measured. The blood pressure was considered as the average of the two determinations every 5 minutes at rest.

Before enrolment, all patients signed an informed consent to participate in the study.

Depression screening questionnaire was performed using PHQ-2 (Patients Health Questionnaire) with 2 items, this one having a sensitivity of 87% and a specificity of 78% in detecting major depression and a sensitivity of 79% and specificity of 86% for detecting any type of depressive disorder. Screening for depression was performed at baseline and repeated by cardiologist at intervals of 1 month, during regular monitoring visits for ischemic disease, in the patients in whom depression was not detected.

The questionnaire consists of 2 questions about anhedonia and mood state. The patients who responded positively to both questions were evaluated by the psychiatrist for diagnosis.

Depression severity was assessed using the scale CDS (The Cardiac Depression Scale) containing 26-items. The scale was developed in Australia and it specifically addresses patients with ischemic heart disease. Depending on the scores obtained, depression was classified as mild (CDS 80-89), moderate (CDS 90-99) and severe (CDS> 100). The questionnaire was completed by all the study participants at baseline, at diagnosis and every 3 months for 2 years.

Selection took place during a period of 26 months and the follow-up period of patients was of 24 months (2008-2011).

Statistical analysis

Numerical values of variables were expressed as mean $\pm$ standard deviation (SD). Frequency tables were used; tests: Chi square, Fisher (for 2 qualitative variables), Student, Mann-Whitney, ANOVA (for a qualitative variable and one quantitative). Univariate statistical analysis, multiple logistic regression was performed using the STATISTICA 8.0. program. All the studied parameters were included in the multiple logistic regression and dichotomized. The results were considered statistically significant if $p < 0.05$.

RESULTS

At baseline, depression was diagnosed in 23 patients (9.6%). Of these, most had a history of myocardial infarction (34.8%) followed by patients with ischemic cardiomyopathy (21.7%). The fewer cases of depression at 1 month after the diagnosis of ischemic heart disease occurred in the patients with silent ischemic heart disease (4.3%). Univariate analysis did not show a statistically significant correlation between depression and ischemic heart form ($r = 0.04$, $p = 0.187$).

The average scores obtained by the patients diagnosed with depression at baseline were of 130.08 ± 16.62.

Table no. 1. Characteristics of the study batch

	Mean ±SD	%
Age	60,67±7,86	
Gender (f)	95	39,6%
Form of ischemic heart disease		
Stable angina	48	20%
Unstable angina	44	18,3%
AMI	51	21,2%
Ischemic cardiomyopathy	35	14,6%
Heart failure	20	8,3%
IC silent	23	9,6%
Cardiac arrhythmias or conduction defects of ischemic cause	19	7,9%
score CDS	73,98±40,87	
Severity of ischemic symptoms		
Minor	117	48,8%
Moderate	84	35%
Severe	39	16,2%

The highest scores on CDS questionnaire were received by the patients with a history of MI (134.12 ± 16.62) and the lowest by the silent coronary heart disease patients 113.00 ± 10.08). Depression was more common in males (69.6% vs 30.4%, p = 0.03), and symptoms severity was positively correlated with the diagnosis of depression (r = 0.25, p <0.0001). In terms of age, there were no significant differences between the patients diagnosed with depression vs. non-depressed (61.00 ± 7.98 vs 59.32 ± 7.43, p = 0.35).

At the end of the follow-up period of 24 months, depression was present in 33.8% of patients (n = 81). The distribution on manifestation forms of coronary heart disease showed a higher prevalence of depression in the patients with a history of myocardial infarction (43.1%) and in the patients with ischemic cardiomyopathy (42.9%) and lower in the patients with silent coronary heart disease (21.7%) and in the patients with stable angina pectoris (27.1%), but the differences were not statistically significant (p = 0.36).

Table no. 2. Distribution of depression prevalence according to the form of ischemic heart disease

Form of ischemic heart disease , N=240								
AP	AP	AP	AP	AP	AP	AP	AP	Total
13	13	13	13	13	13	13	13	81
27,1%	27,1%	27,1%	27,1%	27,1%	27,1%	27,1%	27,1%	33,8%
5,4%	5,4%	5,4%	5,4%	5,4%	5,4%	5,4%	5,4%	33,8%

Depression was significantly more common in women than men (53.1% vs 46.9%, Pearson coeff. = 9.322, contingency coeff. = 0.19, p = 0.002).

The average age of the patients with depression was of 63.32 ± 8.06 and of those without depression at the end of the study was of 59.32 ± 7.43, p <0.001.

By classifying the patients into four groups according to age (quartile 1 = 40-49 years old, quartile 2 = 50-59 years old, quartile 3 = 60-69 years old, and quartile 4 = 70-80 years old), it has been shown that the prevalence of depression increases with age, reaching 50% in the patients over 70 years. This is confirmed by the univariate analysis, which shows that age is a predictor for depression (r2 = 0.06, p = 0.03).

Figure no. 1. Distribution of the number of patients with depression according to the form of ischemic heart disease
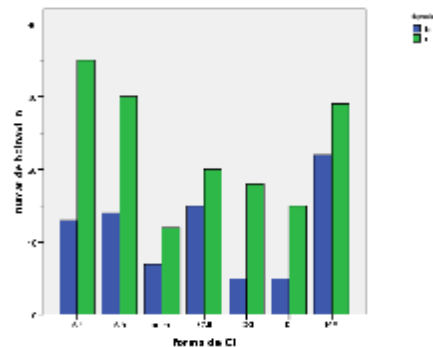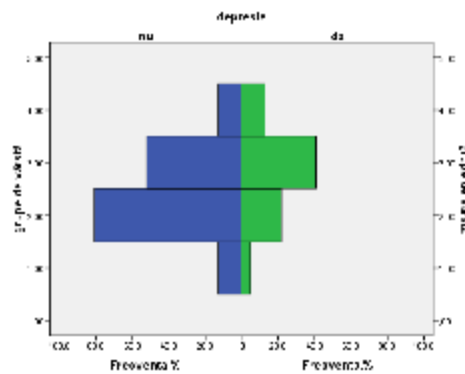

Figure no. 2. Frequency of depression per age groups

The mean time of depression occurrence was 6.95 ± 5.42 months. In the patients with a history of myocardial infarction, the depressive symptoms were installed earlier (6.09 ± 5.24), compared with the patients with silent coronary heart disease, in whom depression was installed later (11.60 ± 8.26).

Table no. 3. Representation of the mean time (months) of depression occurrence according to the type of ischemic heart disease

Time, months				
Form of ischemic heart disease	Mean	Standard deviation	Confidence interval 95%	
			Lower limit	Upper limit
Stable angina	7,53	6,45	3,64	11,43
Unstable angina	7,57	5,72	4,26	10,87
AMI	6,09	5,24	3,76	8,41
Ischemic cardiomyopathy	4,13	3,50	2,19	6,07
Silent ischemic heart disease	11,60	8,26	1,33	21,86
Heart failure	10,80	2,68	7,46	14,13
Arrhythmias	7,28	2,92	4,57	9,99
Total	6,95	5,42	5,75	8,15

CDS questionnaire scores obtained after assesssing the severity of depression experienced a significant variation in the patients with depression and various forms of ischemic heart disease (p = 0.07), the highest scores were obtained in the patients with a history of ischemic cardiomyopathy (138, 66 ± 21.11) and the lowest, in the patients with arrhythmias (97.71 ± 22.34).

Analyzing the occurrence of depression by gender, it was noted that although depression is more common in women, depression appears later in women than in men (8.09 ± 5.65 vs.

5.59 ± 4.87, p = 0,03) and the severity of depression is lower than in males (109.86 ± 22.79 vs 129.43 ± 25.36, p = 0.04).

At the time of diagnosis of depression, heart disease severity was assessed as minor in 17.3% of patients, moderate in 40.7% and severe in 42.7%.

By applying the linear regression model, it was observed that age and severity of symptoms at the time of diagnosis are independent predictors for the occurrence of depression.

Table no. 4. Representation of depression predictors through the linear regression model

Coefficients					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
Age	,011	,003	,187	3,275	,001
IC type	,000	,014	-,002	-,029	,977
Gender_n	,096	,055	,099	1,749	,082
Severity of symptoms	,291	,035	,468	8,441	,000
a. Dependent Variable: depression	a. Dependent Variable: depression				

DISCUSSIONS

The cross-sequential studies conducted so far have shown that a proportion between 19 and 66% of patients with myocardial infarction underwent certain mental disorders, such as depression and anxiety.(1,2,3,4,5,6) Studies report a 17-44% prevalence of depression among the patients with CAD (7,8,9,10). Other 2 studies show that 27% of the patients undergoing coronary bypass are affected by depression after surgery.(11)

In another study, a history of myocardial infarction was independently associated with depressive symptoms occurring during hospitalization.(12)

The results of these studies indicate a high significant prevalence of major depression in the patients with CAD, compared with healthy populations, in whom the prevalence of depression is only of 6.6%.(13)

A review of studies that have followed the incidence and prevalence of depression in primary care reported numerous design differences between studies regarding the characteristics of participants and the methods used to diagnose depression. The same differences were seen in the studies that have sought to determine the prevalence of depression in the patients with various forms of heart disease.

The demographic characteristics of patients vary significantly from one study to another. With regard to age and gender, it was observed that when depression was screen in the general population, it affected mostly females and subjects older than 54 years old. Therefore, the proportion of female subjects in the study may significantly influence the results. In terms of age, the results of studies are contradictory. Thus, some report a higher rate of depression in the elderly, while others report no statistically significant differences between age groups.

Our study shows a higher prevalence of depression in women compared to males and a linear relationship between the risk of depression and age; depression is more prevalent in the patients over 60 years old. Although depression was more common in women, in women depression was installed later than men (8.09 ± 5.65 vs 5.59 ± 4.87, p = 0.03) and the severity

of depression was lower in males (109.86 ± 22.79 vs 129.43 ± 25.36, p = 0.04).

Another factor that may alter the rate of depression is the ischemic condition of the patient, respectively the form of ischemic heart disease, as there is the possibility that patients are respond differently to different forms of coronary heart disease. For example, they reported differences between installed depression rate in the patients with elective surgery compared to those urgently hospitalized for major coronary events. Since the prevalence of depression was reported differently depending on the type of coronary artery disease and demographic characteristics of patients, we cannot make a comparison between the results provided.

Although we found differences in the prevalence of depression in the patients with different manifestations of ischemic heart disease, the differences were not statistically significant.

Except for the studies including patients with acute myocardial infarction, the studies aiming at depression prevalence in the patients with stable coronary artery disease did not specify the average time from diagnosis of the coronary heart disease to the onset of depression.(14)

Our study showed that the average time from diagnosis of the ischemic heart disease to the onset of depression was an average of 6 months, 95% confidence interval of 5-8 months. In the patients with a history of myocardial infarction, the depressive symptoms were installed earlier (6.09 ± 5.24 months) than in the patients with silent coronary heart disease, in whom depression was installed later (11.60 ± 8.26 months).

Regarding the severity of depression in the patients with coronary heart disease, we have identified a single study showing that the patients with a history of depression registered higher scores on depression questionnaires when it was identified during the development of the coronary heart disease, compared with the patients without a history of depression. But we did not find references to analyze the severity of depression by gender or by the forms of ischemic heart disease.

CONCLUSIONS

Depression in the patients with coronary heart disease is more common in the older age and in the female gender. Although males are affected by depression to a lesser percentage, this is installed during the early stages of the coronary disease and its severity is greater in any form of manifestation of coronary artery disease, which translates into a worse prognosis knowing the negative impact of depression on the course of ischemic heart disease.

Depression can occur at any time in the patients with ischemic heart disease and there is need for a continuous screening of depression in this group of patients, especially during the periods when symptoms became worse.

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