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ORIGINAL ARTICLE

Depression and associated factors in patients undergoing coronary artery bypass grafting in Imam Reza Hospital of Mashhad in 2013

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Abstract

Introduction: Anxiety and depression are among major problems encountered by most patients after cardiac surgery. They can have serious consequences for patients' quality of life, physical and psychological morbidity, and follow-up treatments. Accordingly, the present study was conducted to determine the status of depression and the associated factors in coronary artery bypass grafting (CABG) patients hospitalized in cardiac surgery ward of Imam Reza Hospital of Mashhad in 2013.

Methods: The current investigation is a descriptive, cross-sectional study for which all patients undergoing CABG surgery were selected using the census method. The subjects included inpatients hospitalized in Imam Reza (AS) Hospital of Mashhad from April 2013 to March 2014. The data was collected using the demographic characteristics form as well as Beck Depression Inventory (BDI-II). Analysis of data was conducted with SPSS (version 16) using paired t-test, independent t-test, ANOVA and Pearson correlation coefficient. The significance level was set at $P<0.05$.

Results: The mean score of depression after cardiac surgery was 31.5±10.60 and 29.3±10.55 for male and female patients, respectively. From among the patients, 64.4% suffered from severe depression after surgery, while 32.1% had moderate depression. No statistically significant relationship was found between age, sex, marital status, employment status, and education level on the one hand and post-operative depression score on the other hand.

Conclusions: As regards the high rates of pre-surgical and post-surgical depression in patients undergoing CABG, effective communication with patients and patient training are recommended as critical components of nursing care to reduce depression.

Key Words: Depression, coronary artery bypass, surgery, patient

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Introduction

Coronary artery bypass grafting (CABG) is a treatment of choice for angina leading to improved quality of life is [1]. The prevalence rate of depression in patients with coronary artery disease is estimated to range from 20% to 45%. The same rate has also been reported for patients undergoing CABG surgery. Similarly, depression is considered as an independent risk factor for atherosclerotic deposits in the coronary arteries [2].

Depression may lead to immune-regulatory mechanism disorders, which are associated with an increased risk of coronary artery disease. Coagulation disorders and vascular endothelial dysfunction apparently play an etiologic role in the formation or development of atherosclerosis in depressed persons. Similarly, increased white blood cell count, fibrinogen, and increased platelet activation can lead to prothrombotic condition, thrombus formation, and myocardial ischemia [3].

Furthermore, depression increases severe consequences of atrial fibrillation. Nonetheless, the uncertainty associated with depression makes it highly difficult to control postoperative complications properly [4, 5].

Post-surgical and pre-operation depression predicts the risk of physical and psychological morbidity six months and five years after CABG surgery. Furthermore, pre-operative depression is an important predictor of mortality 30 days after CABG surgery. Depressed patients also have a lower functional and health status six months after CABG surgery [2].

Markers of short-term (such as longer in-hospital stay following surgery, pain, graft site and wound infection) and long-term recovery (such as re-hospitalization rates, future cardiac events, reductions in quality of life, and increased mortality) have been linked with depression [6].

Identifying the depression level after CABG surgery is the first step in taking preventive measures, promoting life quality, and improving compatibility. Accordingly, this study was conducted to determine the status of depression and the associated factors in CABG patients admitted to Imam Reza Hospital (PBUH) of Mashhad in 2013.

Methods

This descriptive, cross-sectional study was carried out from April 2013 to March 2014 in Imam Reza Hospital of Mashhad on 56 patients undergoing CABG. The subjects were selected from among patients who were hospitalized in the cardiac surgery ward of the hospital. The patients who met the inclusion criteria were selected by census during the above-mentioned timespan.

The inclusion criteria for subjects were as follows:

1. Admittance at least one day before open heart surgery
2. Full consciousness and ability to cooperate with researchers to answer questions
3. Ability to speak Persian
4. Physical capability to respond to questions
5. Absence of psychiatric diagnoses such as severe depression, anxiety, and schizophrenia in patients' medical history

All patients entering the study could leave it whenever they wished to.

Data collection tools consisted of a demographic characteristics form, a medical information survey of patients, and Beck Depression Inventory II (BDI) (the revised version of the inventory that has been adapted to the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)) [7, 8].

The inventory has 21 questions with answers scored between 0 and 3. It took about 10 minutes to answer the questions. The minimum and maximum scores of this inventory were 0 and 63 respectively. The BDI-II cut-off points were as follows:

0-13= minimal depression
14-19= mild depression
20-28= moderate depression
29-63= severe depression

The reliability coefficient between the inventory and Hamilton Rating Scale for Depression (HRSD) was +0.71, and its one-week test-retest reliability equaled 0.93. The internal consistency of the inventory was also 0.91 [7]. To determine the validity and reliability of the BDI-II, a study was conducted on 354 patients diagnosed with major depression in Iran which yielded the following values: the mean total score=9.79, standard deviation=7.96, Cronbach's alpha=0.78, and one-week test-retest reliability=0.93. The

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validity and reliability of the questionnaire were also confirmed by Khani in Tehran [8].

The researcher completed the questionnaires by interviewing the patients one day before surgery and after their transfer from the cardiac surgery intensive care unit to cardiac surgery ward. Before this, the purpose of the study was explained to ensure patients' consent and cooperation. Then, the collected data was analyzed by SPSS (version 16, through descriptive statistics) using paired t-test, t-test, ANOVA and Pearson correlation analysis. The significance level was considered at P=0.05. Meanwhile, normality was tested through Kolmogorov-Smirnov test besides homogeneity of variance that was evaluated by Levene's test.

Results

The age of the participants ranged from 45 to 76 years, and 98% of them were married. The mean duration of surgery was 4.0±0.73 hours ranging from 3 to 7 hours. Other demographic and medical characteristics of patients are given in Tables 1 and 2. Table 3 shows the frequency of depression in patients before and after surgery. The mean depression score in patients was 11.7±7.00 and 30.0±10.28 before and after operation, respectively. Paired T-test results demonstrated that there is a significant difference between depression scores before and after surgery in patients undergoing CABG surgery (P<0.001). However, Pearson correlation test results revealed that there was no significant relationship between age, duration of surgery, levels of hemoglobin, hematocrit, C-reactive protein and depression scores after surgery. Moreover, a statistically significant and inverse relationship was detected between erythrocyte sedimentation rate (ESR) before and after surgery and depression scores after surgery (Table 2). Independent t-test findings yielded no significant differences between variables as gender, marital status, type of surgery, ventricular tachycardia, atrial fibrillation, ventricular fibrillation and depression scores after surgery (Table 1). In a similar way, no significant differences was found by one-way ANOVA between the variables of employment status, education level and depression scores after surgery (Table 1).

Table 1: Comparison of the patients' mean depression score based on their demographic and medical characteristics

Variable	Dimensions	Number	Depression scores (Mean±SD)	P-value
Gender	Male	37	30.6±10.31	0.569 *
	Female	17	28.8±10.42	
Marital status	Single	1	16.0±0.0	0.151*
	Married	47	31.1±10.25	
Employment status	Self-employed	24	30.1±9.93	0.781**
	Employee	1	20.0±0.0	
	Housewife	1 5	28.6±10.58	
	Retiree	7	29.5±9.62	
Level of education	Illiterate	2 6	30.1±10.28	0.814**
	Reading and writing	10	32.7±9.96	
	High school diploma	5	30.8±13.82	
Type of operation	With pump	5	34.2±11.94	0.327*
	No pump	46	29.3±10.16	
Ventricular tachycardia	Yes	2	34.5±14.84	0.495*
	No	50	29.4±10.13	
Atrial fibrillation	Yes	1	21.0±0.0	0.399 *
	No	51	29.7±10.22	
Ventricular fibrillation	Yes	1	39.0±0.0	0.350*
	No	49	29.1±10.30	

*Independent t-test ** ANOVA test

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Table 2: Correlation between depression score and variables as hemoglobin, hematocrit, erythrocyte sedimentation rate, and C-reactive protein in patients under study

Variable	Before operation	Pearson correlation coefficient test result	After operation	Pearson correlation coefficient test result
	Mean±SD		Mean±SD	
Hemoglobin (Hb)	13.3±2.03	P=0.459, r=0. 1	11.3±1.33	P=0.211, r=0.1
Hematocrit (Hct)	39.6±5.29	P=0.858, r=0. 0	34.2±5.93	P=0.933, r=0.1
Erythrocyte sedimentation rate (ESR)	11.9±15.30	P=0.00 8, r=0. 3	47.0±32.54	P<0.001, r=-0.5
C-reactive protein (CRP)	10.8±16.32	P=0.610, r=0.0	40.9±48.79	P=0.126, r=0.2

Table 3: Distribution of levels of depression in patients before and after surgery

Levels of depression	Before operation	After operation
	N(%)	N(%)
Minimal	31(55.4)	0(0.0)
Mild	16(28.6)	10(17.9)
Moderate	9(16.1)	18(32.1)
Severe	0(0)	26(46.4)

Discussion

The results showed that there was a statistically significant difference in depression scores before and after surgery in patients undergoing CABG surgery such that the average depression score was higher in patients after surgery. In a study on 155 CABG patients, Gallagher (2009) showed that those who had preoperative anxiety and depression experienced a higher level of anxiety and depression after surgery [9]. Evidence also shows that the majority of patients develop symptoms of anxiety, depression and mental illness after CABG because of concerns over returning to work and normal life [10].

In the present study, no significant association was detected between depression and variables including operation time, levels of hemoglobin, hematocrit, CRP, type of surgery, ventricular tachycardia, atrial fibrillation, and ventricular fibrillation. On the other hand, there was a statistically significant and inverse relation between postoperative erythrocyte sedimentation rate and depression score after surgery. Erythrocyte sedimentation rate (ESR) is among the potential diagnostic biomarkers that can be used to aid in the clinical diagnosis of depression. The results of some studies have showed that ESR is higher in depressed patients than in healthy volunteers as well as in depressed smokers compared to non-depressed never-smokers. The ESR is also high in depressed patients with rheumatoid arthritis (RA) in contrast to non-depressed patients with RA [11].

The present study revealed no statistically significant relationship between depression and age, sex, marital status, employment status, and education level. As regards factors affecting hospital anxiety and depression, a few studies have indicated that personal characteristics such as age, sex, marital status, family conditions, and education level are effective on the incidence of depression after coronary artery bypass surgery [2, 12-20].

However, a number of investigations have demonstrated no statistically significant difference between individual characteristics of age, sex, marital status and education and post-surgical depression [21-23]. The difference between the results of these studies may go back to the different kinds of tools employed as well as to the socio-cultural and economic variations of subjects studied.

One of the limitations of this research concerned the patient's responses to questions that could be affected by their mental conditions. Based on this, it is recommended that patients undergo a psychiatric examination in future studies after completing the depression questionnaire. Among the other constraints of this research were patients' history of surgery, history of hospitalization, underlying diseases, smoking, economic, social and support status-that were not addressed in this study, limiting the generalizability of the findings. Therefore, it is also suggested that this study be repeated with a larger

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sample size and a focus on further controlling variables.

Conclusions

As regards the high rates of depression before and after surgery in patients undergoing CABG surgery, education and effective communication with the patient is recommended as a simple, inexpensive, efficient and cost-effective way to reduce patients' depression.

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