

Comparisons between Insomnia Incidence after Coronary Artery Bypass Graft Surgery with Coronary Angioplasty

Abstract

Background: The aim of this study was to investigate the incidence of insomnia after coronary angioplasty and coronary artery bypass graft surgery (CABG) and compare them. **Materials and Methods:** This cross-sectional study was done in Masih Daneshvari and Emam Hossein Hospital of Tehran during a period of 12 months in 2016. The study group consisted of patients who were admitted to these hospitals with heart disease and had to go under CABG or angioplasty. Each participant completed a detailed Persian version of the insomnia severity index and demographic questionnaire which includes demographic questions and questions about the onset or durability of sleep as well as questions about the use of alcohol, caffeine, cigarettes, and sleeping drugs 2 days before the surgery and 1 week after that. The state of insomnia was measured before and after the CABG and compared with the state of insomnia before and after angioplasty. **Results:** About 150 patients were included in the study (80 men [67.4%] and 70 women [43.6%]). In the CABG group, 14.67% of the preoperative patients and 24.0% of the patients after the operation had insomnia, and the difference between them was significant ($P = 0.003$). Furthermore, in the angioplasty group, 14.67% of the preoperative patients and 20.0% of the patients after the operation had insomnia, and the difference between them was significant ($P = 0.001$). **Conclusion:** Insomnia after both CABG and angioplasty was significantly increased but in CABG group this increase was more than angioplasty.

Keywords: Coronary artery bypass, angioplasty, insomnia, sleep disorders

Introduction

Insomnia is defined as disturbed quality or quantity of sleep, which means difficulty in starting or staying asleep and may be accompanied by disturbances in the objective indicators of sleep. Insomnia is the most common type of sleep complication and may be persistent or transient.^[1] Studies have shown that its prevalence is about 30%–40% in adults.^[1,2] This sleep disorder includes two subtypes of short-term and continues. Short-term insomnia is accompanied with anxiety. In some people, this transient disorder may come from life stress or loss of family members. Continuous insomnia actually is a common group of disorders; most of the people who suffer from continuous insomnia present difficulty in falling asleep not staying asleep. This disorder is significantly related to repetitive annoying thoughts.^[2]

Various medical conditions such as chronic pain, heart failure, hyperthyroidism,

heartburn, restless leg syndrome, certain medications, and drugs (caffeine, nicotine, and alcohol) are the prevalent causes of insomnia.^[3,4] Surgical procedures result in heart failure such as coronary artery bypass graft surgery (CABG) may cause insomnia.^[5] CABG is a kind of surgery in which blocked coronary arteries are bypassed that can be a treatment of choice for angina and decrease mortality due to blockage of coronary arteries, as arteries and veins from other parts of the body are grafted into coronary arteries to improve blood supply to the heart.^[4,6] CABG is an invasive operation with a long recovery time, and patients undergoing this surgery are exposed to many known causes of insomnia, including mild and painful procedures and changes in the commonplace. Insomnia is common in these people, due to the long duration of this operation and the involvement of the circulatory system and as a consequence of blood supply disorders to the sleep and waking center (hypothalamus).^[7]

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On the other hand, coronary angioplasty is a technique for opening a blocked coronary artery by using a catheter. Angioplasty in many cases could be replaced with CABG. In this method, the catheter is inserted into the blood vessels through the skin. Many patients who do not respond to medication need angioplasty. There are also insomnia problems due to the circulatory system involvement in this technique.^[8]

Existing studies indicate the link between these two surgical techniques and insomnia.^[7-10] For example, in a descriptive study conducted in Thailand, chest pain, leg pain, and insomnia were presented after CABG.^[9] Furthermore, in another study that measured the incidence of sleep and fatigue in men and women after angioplasty and looked at the quality of sleep, a significant number of people had difficulty falling asleep.^[10] A further descriptive study done on patients undergoing CABG showed that patients who had no sleep disorder before the surgery showed sleep disruption the day after the surgery and during recovery.^[7]

Because of the high prevalence of insomnia after CABG and angioplasty and lack of adequate studies on this subject, this study was designed to provide a more accurate correlation between these two surgical techniques and insomnia which occurs after them to find out the best treatment of choice with lesser side effects.

Materials and Methods

This cross-sectional study was done in Masih Daneshvari and Emam Hossein Hospital of Tehran during a period of 12 months in 2016. The Institutional Human Subjects Review Board approved the study protocol, and all patients signed an informed consent. This study was a part of the psychiatry specialty thesis that approved with the Ethics Committee of the Shahid Beheshti Medical University of Tehran.

The study group consisted of patients who were admitted to these hospitals with heart disease and had to go under CABG or coronary angioplasty. Patients who did not use any kind of medication for sleep disorders were chosen by a convenient sampling method and those who already had sleep disorder and consumed sleep pills were excluded. Inclusion criteria were filling the informed consent for participation to the study and medical indication for CABG or angioplasty. Exclusion criteria were patients who had undergone emergency surgery, previous history of use psychoactive drugs, or major mental illness such as bipolar one disorder, schizophrenia, major depressive disorder and addiction, and patients with multiple organ failure.

According to this formula $N = \frac{2(1 - \frac{d}{2})2(p[1 - p])}{D2}$ a sample size of 75 was chosen for each group.

Each participant completed a detailed Persian version of the Insomnia Severity Inventory (ISI) questionnaire. ISI questionnaire measured the severity of insomnia during

2 weeks ago and has 5 questions with 0–28 total scores. This questionnaire was designed by Morin *et al.* in 1993 with acceptable reliability and validity (Cronbach's alpha was 0.74 and 0.78, and variance of construct validity was 0.72). In the study by Parsaei-Rad *et al.*, the Persian version of the ISI questionnaire had acceptable validity and reliability (Cronbach's alpha was 0.54).^[11] We also used a "demographic questionnaire" which includes demographic questions, questions about the onset or durability of sleep, as well as questions about the use of alcohol, caffeine, cigarettes, and sleeping drugs 2 days before the surgery and 1 week after that.

In order to remove confounding variables such as thyroid disorders or heart disease and alcohol consumption, the questionnaire questioned before and after the surgery has the same design. In fact, in this study, the state of insomnia was measured before and after the CABG and compared with the state of insomnia before and after angioplasty.

At the end, statistical analysis was performed using the *t*-test and Chi-square in SPSS 16 (SPSS Inc., Chicago, Ill., USA).

Results

About 150 patients were included in the study (80 men [67.4%] and 70 women [43.6%]), who were studied in terms of gender and age. Each group of CABG and angioplasty had 75 patients. Demographic factors are shown in Table 1.

As shown in Table 1, the baseline characteristics (age, gender, and insomnia) had no significant difference between the two groups. Furthermore, the results of this study present that the rate of insomnia increases after the surgery in both groups ($P = 0.001$), and the incidence of insomnia in both groups was higher in males than females ($P = 0.032$). There was no significant correlation between changes in insomnia in different age groups in both groups ($P = 0.61$). In Table 2, insomnia incidence between two groups of the study was compared.

The causes of preoperative sleep disorder (in both groups) were going to the toilet, thirst, shortness of breath, pain, and anxiety. The causes of postoperative sleep disorder in the CABG group were pain, going to the toilet, thirst, or anxiety and in the angioplasty group were going to the toilet or thirst, shortness of breath, and pain. Furthermore, the most common causes of insomnia aggravation in both groups include noise, work, and travel stress, and factors that improve the quality of sleep were good ventilation and sex.

Furthermore, insomnia in people who previously had psychiatric illness or various medical conditions was not significantly different from those who did not have these diseases.

Table 1: Comparison of demographic factors between coronary artery bypass graft and angioplasty groups

Variable	CABG group	Angioplasty group	P
Insomnia prevalence			
Before procedure (%)	11 (14.67)	11 (14.67)	NS
After procedure (%)	18 (24.0)	15 (20.0)	0.001*
Gender			
Male (%)	40 (53.33)	38 (50.67)	0.82*
Female (%)	35 (46.67)	37 (49.33)	
Age	64.18±8.2	65.14±7.8	0.14**

*Chi-square test, **T-test. CABG: Coronary artery bypass graft

Table 2: Comparison of insomnia incidence between coronary artery bypass graft and angioplasty groups and genders

Variables	Insomnia prevalence		P
	Before procedure (%)	After procedure (%)	
Study groups			
CABG group	11 (14.67)	18 (24.0)	0.001*
Angioplasty group	11 (14.67)	15 (20.0)	0.003*
Gender			
Male (80 number)	12 (15.0)	20 (25.0)	0.032*
Female (70 number)	10 (14.3)	13 (18.57)	

*Chi-square test, CABG: Coronary artery bypass graft

Discussion

Insomnia after CABG and angioplasty is the important problem with a high prevalence that effect on quality of life and daily function of patients.

The results of this study showed that both CABG and angioplasty can significantly increase the incidence of insomnia after surgery. The most common causes of insomnia after the surgery in both groups were due to their lifestyle, culture, hospital system, and community problems.

Patients who underwent CABG showed more insomnia after the surgery compared with the angioplasty group. It may be due to longer duration of CABG surgery, use of anesthetic drugs in this surgery, and longer recovery time and postoperative pain.

Poor health-related quality of life and also adverse clinical outcomes of CABG may be complicated by depression and insomnia. Insomnia after CABG surgery effects on quality of life and the impact of a collaborative care strategy. In a study on 150 CABG patients with the same control group, after 8 months, participants with baseline insomnia reported greater improvements in mental health-related quality of life, but insomnia was not a significant moderator of the effect of collaborative care. The results of that study showed a long-term impact on insomnia among post-CABG patients treated for depression.^[12]

Quality of life after CABG is one of the most important factors for return to work and ordinary behavior. In a study on 243 patients the quality of life with the Nottingham Health Profile Questionnaire was evaluated at 6 months after elective coronary artery bypass surgery and results showed quality of life (before and after CABG surgery) in all sections specially in physical mobility, energy, and pain was significantly worse in all patients.^[13]

On the other hand, some processes such as admission in the intensive care unit (ICU) had worse effects on sleep quality. Intensive care patients experience poor sleep quality. Psychological distress and diminished quality of life are also common among patients with CABG surgery. The effect of on- versus off-pump surgery on sleep and recovery has not been reported. In a study on 101 patients who underwent on-pump CABG surgery with a median ICU stay of 2 (2–4) days, 62% of the patients report poor sleep at 6 months after surgery. Furthermore, 12% of the patients report poor sleep quality at all-time points. Also, off-pump CABG patients had fewer posttraumatic stress symptoms and better quality of life. In multivariate analysis, prehospital insomnia and physical and mental health-related quality of life were independently associated with sleep quality at 6 months. There was no association between on- versus off-pump CABG and sleep quality at 6 months. Sleep quality of postoperative CABG patients was poor in the ICU and hospital ward and up to 6 months after discharge from the hospital. Poor sleep quality at 6 months was associated with prehospital insomnia and physical and mental HRQOL at 6 months, but not with on- versus off-pump surgery.^[14]

The results of a systematic review showed that more than 50% of patients experienced sleep problems through hospitalization and 6 months after heart surgery.^[11] Factors that influence sleep disturbance during hospitalization and 6 months after discharge are different. During hospitalization, physical and environmental factors (e.g., pain, cardiac function, and noise) and through 6 months after recovery, psychological factors such as anxiety and mood disturbance affect the patients' quality of sleep.^[15] Poor sleep quality interferes with the cardiac patients' quality of life.^[16-18]

Furthermore, some studies showed an educational intervention-based model as a framework integrating the recognized mediators of sleep, and comprehensive intervention for rehabilitation programs in cardiac rehabilitation centers may improve the quality of sleep after CABG^[19] and training at the discharge time and counseling services had a higher mean self-care score and fewer problems experienced following discharge. It had a positive impact on the self-care ability of these patients and on alleviating the problems they encountered.^[20]

Conclusion

The problems and limitations of this study included a lot of questions about the questionnaire and lack of follow-up of some patients after surgery. Furthermore, a number of questionnaires, such as a history of psychiatric problems or a history of drug therapy, were required by the observer to explain.

Regarding the longer duration of CABG surgery and the need for anesthesia, as well as greater insomnia in people treated with CABG, angioplasty can be a better treatment of choice in cases of heart disorders.

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Conflicts of interest

There are no conflicts of interest.

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