

Original Article: Incidence of Atrial Fibrillation after Coronary Artery Bypass Graft Surgery and Risk Factors Affecting

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ABSTRACT

Introduction: Postoperative onset atrial fibrillation (POAF) is a common complication of coronary artery bypass surgery (CABG). However, the long-term risk of thromboembolism in patients who develop POAF after CABG surgery is unknown. Also, there is no information about stroke prevention in this setting. To investigate the long-term risk of stroke and thromboembolism in patients with new-onset POAF after initial CABG alone compared with patients with non-functional non-valvular atrial fibrillation (NVAF)

Material and Methods: This study used data from the Clinical Cardiac Surgery Database and the Danish National Registry to identify patients undergoing a primary CABG procedure and de novo CABG between January 1, 2000 and June 30, 2015. The age, sex, CHA2DS2-VASc score and year of diagnosis of these patients were compared with dysfunctional NVAF between 1 and 4. Data analysis was performed between 2012-15. Proportion of patients starting oral anticoagulation within 30 days and thromboembolic rate.

Results: 115 patients who developed POAF after CABG surgery and 115 patients who developed NVAF were compared. In the total population of 10,540 patients, the median (interquartile range) age was 69 years.2 (63.7-74.7) years; 8675 patients (82.3%) were male. 175 POAF patients (8.4% and 3549 patients with NVAF (42.9%). The risk of thromboembolism was lower in the POAF group than in the NVAF group (18.3 vs. 29.7 events per 1000 person-years; adjusted hazard ratio [HR], 0.55; 95% confidence interval, 0.32-0.95; P = .03) and NVAF (adjusted HR, 0.59; 95% CI, 0.68; P < .001) compared with patients not receiving anticoagulant therapy.

Conclusion: Patients undergoing CABG surgery had a longer risk of thromboembolic new POAF than those undergoing NVAF. These data do not support the view that de novo POAF should be considered the same as primary NVAF in terms of long-term thromboembolic risk.

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Introduction

Coronary artery disease is one of the most common cardiovascular diseases that can be associated with disorders such as dysrhythmia. Atrial fibrillation is one of the most common cardiac dysrhythmias. The burden of atrial fibrillation on the world is unknown[1]. Atrial fibrillation is one of the most common persistent cardiac dysrhythmias that is frequently encountered in clinical settings. This dysrhythmia is considered as one of the important causes of illness, an independent risk factor for death and sudden death. This disorder is common in the world and as a risk factor for stroke, it is necessary to prevent it; So that maintaining a normal rhythm in these patients is one of the main goals of the treatment process[2].

Atrial fibrillation is one of the most common dysrhythmias after coronary artery bypass graft surgery. According to reports on the prevalence of atrial fibrillation after coronary artery bypass graft surgery, 20-30% of patients develop this disorder. In a study, the prevalence of this disorder in patients after coronary artery bypass graft surgery was reported to be 10-50%[3,4]. Researchers point to thromboembolism as one of the negative consequences of atrial fibrillation

[3-5]. In contrast, some researchers consider atrial fibrillation after coronary artery surgery to be benign and believe that the disorder is automatically limited; Of course, in rare cases, it also has fatal consequences. Some researchers believe that the survival of patients after coronary artery bypass graft surgery, in which atrial fibrillation develops, is about 0-4 years[5]. Atrial fibrillation can lead to unstable conditions, frequent hospitalizations, increased hospital stays, the risk of stroke, increased mortality, the need for intensive care, the need for repeated intubations, the risk of heart failure, and the cost of hospitalization [6].

It is believed that several risk factors such as age, deprivation of beta-blockers, decreased left atrial function, left atrial enlargement and right coronary artery stenosis affect the incidence of atrial fibrillation. Some researchers have pointed to the relationship between body mass index and atrial fibrillation in patients with diabetes [7-9], hypertension and age over 70 years compared to others, and some have considered obesity as the most important factor in preventing atrial fibrillation in adults. Echocardiographic data indicate a combination of obesity and atrial fibrillation(Figure 1).

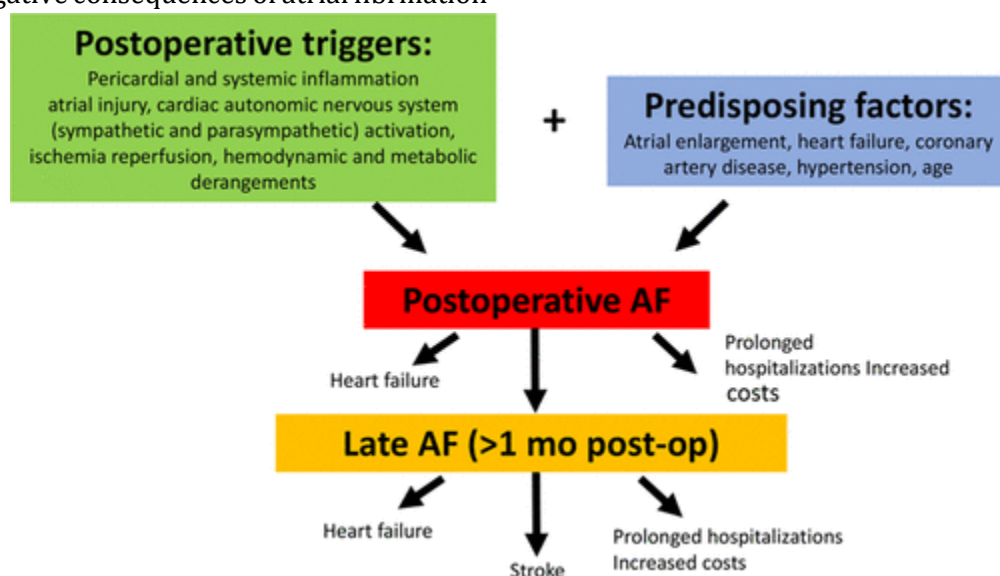


Figure 1: AF risk Factor

The mechanisms involved in the pathophysiology of atrial fibrillation are not fully understood due to their complexity; Identifying patients at high risk for atrial fibrillation after surgery is still a challenge. It should be noted that attempts have been made to make logical logistics models based on variables before and during surgery [10-12]; However, these efforts to provide predictors of atrial fibrillation after coronary artery bypass graft surgery remain limited and require more performance-based evidence [13-15]; In addition, non-valvular atrial fibrillation (NVAf) is known to be associated with the risk of stroke and systemic embolism, which can be reduced by oral anticoagulants (OAC), vitamin K or non-vitamin K antagonist OAC [16-18]. However, data on stroke prevention in de novo POAF after CABG are lacking, and international guidelines for the management of patients with atrial fibrillation (AF) do not offer recommendations for this problem. More importantly, long-term data on the long-term risk of thromboembolic events in these patients are scarce and inconsistent [19]. To address these experiences, we conducted a retrospective study in Denmark to examine the long-term risk of stroke and thromboembolism in a cohort of patients with de novo POAF and pooled NVAf patients after primary CABG alone. Because the value of predictive and negative factors is high and positive predictive factors are insignificant [20-22]; Therefore, obtaining evidence-based information can be useful in determining high-risk patients for atrial fibrillation after coronary artery bypass graft surgery. In addition, identifying risk factors for atrial fibrillation in patients undergoing coronary artery bypass graft surgery can play an important role in controlling postoperative complications [23-25]. Considering the challenges in determining high-risk patients in terms of atrial fibrillation dysrhythmia, the present study was performed to determine the incidence of atrial fibrillation

after coronary artery bypass graft surgery and its risk factors in patients referred to hospitals affiliated to Tabriz University of Medical Sciences [26].

Material and Methods

Study design: The present retrospective cross-sectional study was performed during nine months with the aim of reviewing the files of 150 patients undergoing coronary artery bypass graft surgery referred to the affiliated hospital of Tabriz University of Medical Sciences (Shahid Madani Hospital) [27-29]. Independent variables in this study were: demographic characteristics, underlying diseases and structural disorders of the heart. Atrial fibrillation was also considered as a dependent variable. In this study, the hospital records and ECG of 150 patients undergoing coronary artery bypass graft surgery were examined for atrial fibrillation after surgery and their demographic characteristics were recorded, and the information obtained was recorded in a questionnaire. Sampling was easy and accessible.

Inclusion and exclusion criteria: The inclusion criteria in the study process was its registration in the list of coronary artery bypass graft surgery records referred to the hospital affiliated to Tabriz University of Medical Sciences (Shahid Madani Hospital). It should be noted that the presence of fibrillation dysrhythmia or atrial flutter before surgery and the lack of ECG sheets, echocardiography, angiography and ICU sheets in the archived file were considered as criteria for excluding files [30].

Methodology: Data collection tools in this study were: ECG, echocardiographic results, angiography and researcher-made questionnaires to assess demographic information such as age, sex, weight, height, body mass index, drugs used before surgery,

number Involved coronary arteries, underlying diseases, smoking and other drug use were recorded. In this study, ECG was evaluated for atrial fibrillation and the symptoms of this dysrhythmia after coronary artery bypass graft surgery, such as irregular R-R distance and P-wave in the patient's ECG were considered. In order to determine body mass index, recorded data related to height and weight in the records of patients undergoing surgery were used. In this study, patients undergoing coronary artery bypass surgery were divided into the following six groups based on body mass index: body mass index 16.5 to 18.5 (weight loss), body mass index 18.5 to 25 (normal), body mass index 25 to 30 (overweight), body mass index 30 to 35 (class 1 obesity), body mass index 35 to 40 (class 2 obesity), body mass index more than 40 (class 3 obesity) [31-33].

Data analysis: The collected data were analyzed using SPSS statistical software version 22. Descriptive and inferential statistical methods (chi-square and t-test) were used to analyze the data. It is worth noting that the researchers were committed to the Helsinki Convention at all stages of the project. Due to the retrospective study, no intervention was made for patients and no cost was imposed on them [34].

Ethical considerations: It is worth mentioning that the whole process of the present study was carried out after the approval and approval of the ethics committee of Tabriz University of Medical Sciences [35]. Thus, after stating the

objectives of the study, along with presenting the letter of introduction of the Vice Chancellor for Research of Tabriz University of Medical Sciences to the hospital officials, permission was granted to introduce them to the archive unit. After visiting the unit, the researchers asked them for a list of patients undergoing coronary artery bypass surgery, which was presented to the researchers as a printout. The hospital records were reviewed by the researchers during nine months and the information related to ECG examination, echocardiography results, angiography and patients' records were recorded in the questionnaires. In total, 150 cases were reviewed. In order to observe the principle of confidentiality and anonymity, the questionnaires were coded and to prevent duplicate registration of file information, after entering the information in the questionnaires, it was marked next to the file number [36].

Results

Most participants in the study (62.7%) were male. The mean age of the subjects was 60.2 ± 10.3 years and they ranged in age from 31 to 87 years. The mean body mass index of the participants was 24.4 ± 3.9 and most of them (55.4%) had a normal body mass index. 31.1% were also overweight. Based on the results, the mean discharge fraction was 49.7 ± 10.3 . Most people had blood type (38.4%) O +. The mean hemoglobin of the participants was 12.7 ± 1.8 . The rate of dysrhythmias also increased to 81.8% after surgery (Figure 2).

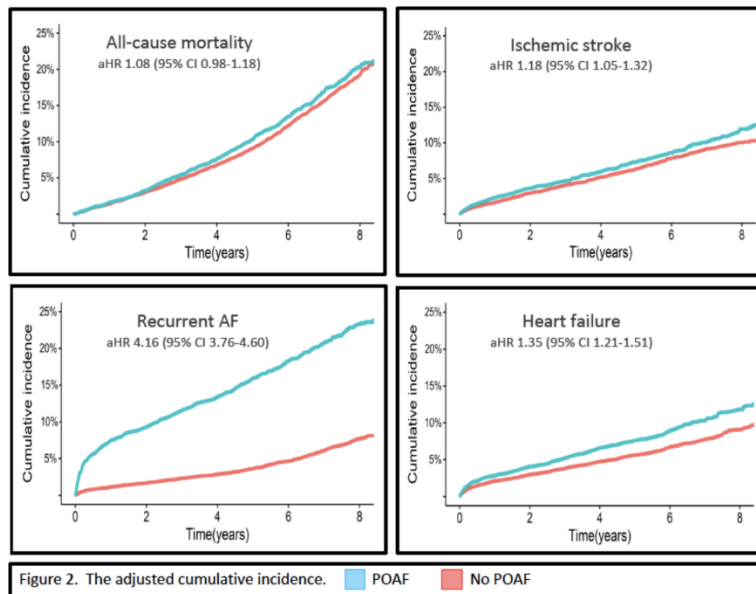


Figure 2: Fifference of AF after CABG

In the present study, the incidence of atrial fibrillation in patients after coronary artery bypass graft surgery was reported to be 18.9%. Underlying diseases and disorders There is a statistically significant relationship between the incidence of atrial fibrillation and cognitive demographic characteristics such as sex, age, body mass index, smoking, duration of smoking

based on year, discharge fraction, number of blocked coronaries, hemoglobin, blood pressure There are no systole, diastole or blood type. There was no association between atrial fibrillation and previous underlying diseases such as stroke, chronic obstructive pulmonary disease, hyperlipidemia, hypertension and diabetes mellitus(Figure 3).

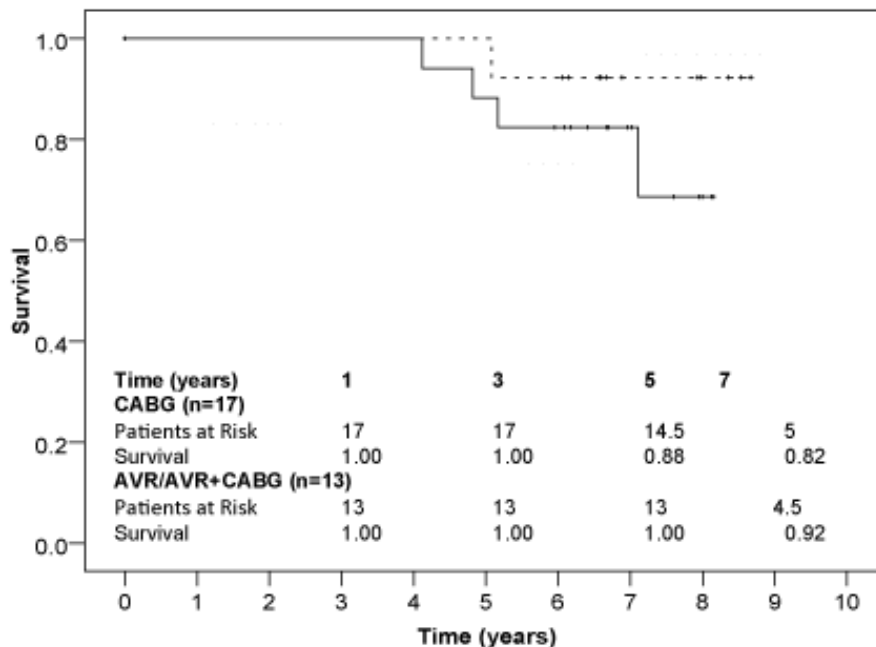


Figure 3: Survival rate after AF in CABG

In contrast, there was a significant relationship ($P < 0.001$) between the incidence of atrial fibrillation after coronary artery bypass graft surgery and the size of the left atrium and its hypertrophy (Pearson chi-square value = 19.103). This means that a higher percentage of people with atrial fibrillation also had left atrial enlargement and hypertrophy. On the other hand, based on t-test, there was a significant relationship ($P < 0.001$) between age and the incidence of atrial fibrillation after surgery. This means that the incidence of atrial fibrillation was higher in older people [29-31].

Discussion

The aim of this study was to determine the incidence of atrial fibrillation after coronary artery bypass graft surgery and the risk factors affecting it in patients referred to the hospital affiliated to Tabriz University of Medical Sciences (Shahid Madani Hospital). The results of this study showed that the incidence of atrial fibrillation after coronary artery bypass graft surgery was 18.9% in the participants. In this regard, researchers in their study reported the incidence of atrial fibrillation in patients undergoing heart surgery 20-40% and in other non-cardiac surgeries performed on the chest 10-20%. Other researchers believe that atrial fibrillation is common after heart surgery and its incidence in patients undergoing coronary artery bypass grafting is 5-40% [32-34]. On the other hand, a researcher in a retrospective study on postoperative information of 1248 patients undergoing coronary artery bypass graft surgery reported that the incidence of atrial fibrillation after coronary artery bypass graft surgery was 17.2% (215 patients) from October 2006 to March 2013. In this regard, other studies have reported values of 15-30%, 16%, 30.9%, 17.2%, 21% and 31.2% in relation to the incidence of atrial fibrillation after coronary artery bypass graft surgery [35-37].

Also, in a study conducted by researchers in Iran, the rate of atrial fibrillation after coronary artery bypass graft surgery in patients treated with statins was 6.5% and in patients who did not have statins in the treatment regimen, 25.6%. Consistent with the present study, two other researchers reported an 18% incidence of atrial fibrillation after coronary artery remodeling [9]. Some researchers have cited age, sex, a history of atrial fibrillation, a history of congestive heart failure, and a heart rate of more than 100 beats per minute during back surgery as independent predictors of atrial fibrillation after surgery. They believe that surgical approaches such as pulmonary vein venting, bicaval venous cannulation, post-operative atrial pacing and longer clamp times are independent predictors of atrial fibrillation after surgery [39-41].

One of the executive problems of the present study is the incompleteness of the information in some cases; For example, the height and weight of some patients were not recorded on their admission form; However, with more detailed case studies, this information was collected from the anesthesia prescription record sheet during surgery, and archived files that did not have ECG, echocardiography, angiography, and ICU sheets were removed according to exclusion criteria [42].

Conclusion

Atrial fibrillation is one of the most common complications after coronary artery bypass graft surgery, which increases the length of hospital stay in the ICU and may lead to hemodynamic disturbances and increase the risk of embolism. In the present study, the incidence of atrial fibrillation after coronary artery bypass graft surgery was 18.9%. In this study, no statistically significant relationship was found between demographic characteristics and other underlying diseases. Based on the results, the size of the left atrium and its hypertrophy as well as age were introduced as risk factors for atrial

fibrillation, which can be useful in determining high-risk patients for atrial fibrillation after coronary artery bypass graft surgery. Researchers on the subject of atrial fibrillation and its complications, the need for further studies.

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