Comparison of the Length of Hospital Stay between the Patients with Atrial Fibrillation Treated with Amiodarone and Patients with Normal Sinus Rhythm after Coronary Artery Bypass Graft

Samad Shams Vahdati[1*], Jahanbakhsh Samadikhah[2], Seied Hadi Hakim[2], Rasoul Azarfarin[2], Mahsa Ansarin[3]

[1]Department of Emergency Medicine, Imam Reza Hospital, Tabriz University of Medical Sciences, Tabriz, Iran
[2]Cardiovascular Research Center, Tabriz University of Medical Science, Tabriz, Iran
[3] Faculty of Dentistry, Tabriz University of Medical Sciences, Tabriz, Iran

A R T I C L E   I N F O

A B S T R A C T

Introduction: Postoperative atrial fibrillation occurs in 20 % to 40 % of patients undergoing coronary artery bypass grafting (CABG) and contributes to increasing length of stay and hospital cost . The purpose of our study was to compare the length of hospital stay between patients of postoperative atrial fibrillation treated with amiodarone (experimental) and those with normal sinus rhythm (NSR) (Control) after CABG. *Methods*: From October of 2008 to October 2010, our experimental group including 26 patients was treated with amiodarone in Tabriz Madani Heart Center. The background variables, length of atrial fibrillation, and length of hospital stay were recorded. The experimental group was compared with a control group of 50 patients. The two groups were the same in terms of age, gender, ejection fraction, vascular diseases and risk factors. *Results*: The hospital stay duration was 8.0 ± 1.6 and 7.4 ± 1.4 days ($p = 0.08$) for experimental, and control groups respectively. Atrial fibrillation occurred mainly (60%) on the second postoperative day. *Conclusion*: 25 patients out of 26 patients (96 %) returned to NSR after starting the amiodarone protocol and the length of hospital stay in the experimental group was not significantly different from that of the control group. Thus, treating with Amiodarone in postoperative atrial fibrillation can reduce hospital stay duration compared to that of normal sinus patients.

Introduction

Atrial fibrillation (AF), occurring in 20% to 40% of patients, is a common complication that increases the cost of CABG (Coronary Bypass Graft) and rate of morbidity.[1]

The exact mechanism of atrial fibrillation is yet to be found; however, some factors such as cardiopulmonary bypass, beta blocker withdrawal, pericarditis, ischemia and atrial damage are considered as predisposing factors. Some morbidities associated with AF following CABG include: Heart failure, thromboembolic complications, increased ventricular response, prolonged hospital stay and increased costs.Efforts to prevent atrial fibrillation after CABG by using different drugs have resulted in different achievements.

Recent studies have shown that these drugs are less effective. Although, beta blockers are believed to affect controlling atrial fibrillation, two studies carried out recently have failed to prove the effect of B blockers.[2]

No specific study has ever been carried out on preventing atrial fibrillation after CABG. Amiodarone, a class III anti arrhythmia drug which affects atrial fibrillation, could be used simply as a treatment on out patients with structural heart disease.[3] The purpose of the present study was to answer the question whether there is a difference in length of hospital stay between patients of atrial fibrillation treated with amiodarone and those with Normal Sinus Rhythm (NSR) after CABG.

Materials and methods

From October of 2008 to October 2010, voluntary patients for CABG who had a clear record of preoperative AF and anti-arrhythmia agent consumption in Tabriz Madani Heart Center were selected. 76 patients

*Corresponding author: Samad Shams Vahdati, E-mail**:** sshamsv@yahoo.com

were subjected to the study. 26 patients out of 76 were placed in the experimental group and the rest in the control group. Patients having undergone alternative heart surgery by lateral thoracotomy were excluded from the study. Likewise, the patients with a history of AF and anti-arrhythmia agents class I or III usage were excluded; however, those with a history of taking digoxine or/and beta blockers and also Calcium channel blockers for reasons other than arrhythmia were included.

All the patients used beta blockers prior to the surgery. Two groups were identical in terms of age, gender, ejection fraction, vascular disease and risk factors. We started Amiodarone protocol for the patients with AF complication firstly by loading dose of 150 mg IV infusion in dextrose 5%in 30 minutes. Then, the medication was continued for 6 hours by 1mg/min and followed for 18 hours at the rate of 0.5mg/min infusion. Treatment was later continued with an oral tablet once a day. The data was statistically analyzed using SPSS 18.0 software. Qualitative variables and quantitative variables between the two groups were analyzed by Chi-square and t-test, respectively. *P* value taken into account was smaller than 0.05. ($P \leq 0.05$)

Results

25 patients out of 26 patients (96%) returned to NSR after starting the Amiodarone protocol. Experimental and control groups were 23 males and 3 females, 41 males and 9 females respectively. The age range of patients was 58.4 ± 8.1 and 57.5 ± 8.0 years for experimental group and control group respectively. One patient from the experimental group was excluded from all statistics because of unresponsiveness to the Amiodarone protocol and changing the treatment protocol.

No significant difference was observed between risk factors of the two groups (Table 1). There was no difference between risk factors and background variables of the two groups. Eight patients in the AF group and 17 patients and in the control group had ventricular dysfunction (P=1.00) with the mean ejection fraction of 0.446 ± 0.076 and 0.462 ± 0.07 respectively (P=0.367; Table 2).Length of hospital stay was calculated from the day of operation to the discharging date and compared between both groups.Hospital stay lasted 8.1 ± 1.6 and 7.4 ± 1.4 days for experimental and control groups respectively. The P value of 0.08 was obtained by t-test statistical procedure suggesting the fact that there was no meaningful difference in the hospital stay duration between two groups. The mean duration of atrial fibrillation was 1003 minutes (120 -3545). 15 out of 25 patients had AF on the 2nd day (60%), 1 patient on the first day, 3 patients on the 3rd day, 2 patients on the 4th day, 2 patients on the 5th day and 2 patients on the 6th day.

Table 1. Comparison of risk factors between two groups

Risk factor	Experimental Group	Control Group	P
Age (years old)	58.4 ± 8.1 N=25	57.5 ± 8.3 N=50	0. 655
Gender (F/M)	3 / 22 N=25	9 /41 N=50	0 . 738
Smoke use	48% N=25	52% N=50	0. 935
Diabetes mellitus	28% N=25	28% N=50	1. 000
Hyper lipid	24% N=25	24% N=50	1. 000
Hyper tension	40% N=25	66% N=50	0 . 058

Table 2. Comparison of cardiac and surgical factors between two groups

Risk factor	Experimental Group	Control Group	P
Vascular disease	3.8 ± 0. 5 N=25	2. 7 ±0 . 6 N=50	0.483
Ejection Fraction	0. 446 ± 0.08 N=25	0 . 462 ± 0. 07 N=50	0 .367
CABG with/without cardiopulmonary pump	8/17 N=25	19/31 N=50	0.799
LV dysfunction	32% N=25	32% N=50	1. 000

Table 3. Comparisons of length of hospital stay in two groups

	Experimental Group	Control Group	P
Length of hospital stay	8.08 ± 1.61 N=25	7.42 ± 1.43 N=50	0.075

Discussion

Many studies have been done on the effectiveness of Amiodarone on prophylaxis of AF; therefore, prescription of Amiodarone is steadily increasing because of the side effects of previously used drugs. Amiodarone is a peripheral and coronary vasodilator. Palpitation, vascular resistance and left ventricular contraction force decrease by IV Amiodarone.[3] The main purpose in treating patients with AF is to decrease thromboemboli and to control the symptoms; and ultimately, decreasing ventricular response to atrial

fibrillation by returning to normal sinus rhythm is sought.[1] IV Amiodarone is almost harmless for patients with ventricular dysfunction and myocardial infarction. Another advantage of Amiodarone is decreasing the rate of ventricular response in the acute condition.[4,5]

Short-term IV treatment by Amiodarone is extremely effective in suppression of supra ventricular tachycardias that occur less than 24 hours before drug administration. The pharmacological contents of Amiodarone act in three ways:

1. The clinical effect on coronary dilation is so important that it allows prescribing of Amiodarone in ischemic heart diseases such as MI.
2. Peripheral vasodilation with small negative inotropic effect allows the use of Amiodarone in patients with low EF.
3. Amiodarone completely controls ventricular tachyarrhythmia caused by short pass and WPW.[6-8]

There are many studies and researches about treating AF. In Andriret *et al.* study which was based on treatment with oral Amiodarone and comparing it with IV Amiodarone group, it was found that 64% of patients receiving oral treatment return to NSR in 24 hours by single dose of 26±0.9 mg/kg.[9] In suppression of arrhythmia using single dose oral Amiodarone in Escobet study by 30 mg/kg, Amiodarone reached maximum concentration in 6 hours and showed its effect in 3 to 8 hours.[10] Flecainide and propofenone are contraindicated in ventricular dysfunction because of their negative inotrope effect and increase in mortality rates in patients with history of MI.[11-13] On the other hand, a few studies have shown Amiodarone to be tolerated in patient with CHF.[14,15] Even *et al.* study showed that 30-50mg/kg single oral Amiodarone is tolerated perfectly well in patients with ventricular dysfunction.[16]

Peuhkurinen study on 62 patients revealed that 50% of patients return to NSR in 8 hours by using 30mg/kg single dose oral Amiodarone but only 20% of the placebo group returned to NSR.[17] In Guido study, 87.7 % of 21 patients with AF returned to NSR in 24 hours by IV Amiodarone.[18] Nowadays, administration of Amiodarone after open heart surgery especially after CABG has gained importance. In Guarnieri study with 300 patients, 67 patients out of 142 (47%) were placed in the placebo group and 56 patients out of 158 (35%) in the group receiving 1gr/dl for 2 days prophylactic IV Amiodarone (p=0.01) had AF complication after surgery. Duration of hospital stay was 8.2±6.2 days for the placebo and 7.6±5.9 days for the amiodarone group. Therefore, it was concluded that low-dose IV amiodarone was effective and safe in prevention of AF, but it did not have a significant effect on the length of hospitalization.[19]

In Daord's study, 16 patients out of 64 in a group which took 600 mg prophylactic oral Amiodarone and 32 patients of 60 in placebo group had AF complication (p=0.003) hospital stay was 6.5±2.6 and 7.9±4.3 days in prophylactic and placebo groups, respectively.[20] Redle administered 2gr of prophylactic Amiodarone (1 to 4 days before and continued by 400mg orally for 7 days after surgery) to 73 patients. 18 patients of this group and 23 patients of 70 in placebo group had AF complication.[1] Harris *et al.* and Hohnloses *et al.*, in two separate studies, said that prophylactic IV Amiodarone decreased rate of AF after surgery.[21,22] Studies reviewed above are on the prophylaxis of AF after surgery. In our study, we aimed to decrease costs and hospital stay in patients with postoperative AF. Therefore, the purpose was to treat AF and to decrease hospital stay in AF group. It should be mentioned that the other patients were free of side effects. On the other hand, based on the fact that the hospitalization span of the experimental group and the control group was 8.1±1.6 days and 7.4±1.4 respectively, and as no considerable difference was observed in the length of hospitalization (*P*=0.01) (Table 3), it is suggested that anti arrhythmic treatment by Amiodarone be used after surgery and only in patients with postoperative AF.

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