

Perioperative Amiodarone Reduces Post-Operative Atrial Fibrillation in Coronary Artery Bypass Grafting Patients

IQBAL ALAM KHAN¹, AQEEL AHMAD², ABDUL MATIN QAISAR³

¹Assistant Professor, Department of Cardiac Surgery, Sandeman Provincial Hospital Quetta,

²Associate Professor, Department of Cardiothoracic Surgery, Shaikh Zayed Hospital Lahore,

³Associate Professor, Department of Physiology, Niazi Medical & Dental College, Sargodha

Correspondence: Dr. Iqbal Alam Khan Email: iqbalkhan_1@yahoo.com

ABSTRACT

Aim: To examine the role of amiodarone in terms of reduction in the postoperative atrial fibrillation in patients undergoing coronary artery bypass grafting.

Study Design: Prospective study

Place & Duration: Department of Cardiac Surgery, Sandeman Provincial Hospital Quetta over a period of 1 year from 1st June 2017 to 31st May 2018.

Methods: In this study 120 patients of both genders were included. Patient's ages were ranging from 30 to 80 years. The patients were divided into two groups, 60 patients in amiodarone (Group A) and 60 in control (Group B). Detailed medical history and informed consent was taken from all the patients. Patients with history of atrial fibrillation and chronic obstructive pulmonary disease were excluded from the study. In group A, all the patients received oral amiodarone 400mg the night before surgery, 400mg at 5 AM on the day of surgery and 400 mg PO/NGT BID for four days post operatively. Group B 60 patients received placebo.

Results: In Group A 49 (81.67%) patients were males while 11 (18.33%) patients were females with mean age 56.7±9.6 years. In Group B, 45 (75%) patients were males while 15 (25%) patients were females with mean age 58.4±7.5 years. Post operative atrial fibrillation occurred in 7 (11.67%) patients in group A (amiodarone) while in placebo group 15 (25%) patients had atrial fibrillation (p-value 0.015). In group A (amiodarone) atrial fibrillation duration was 11.7±5.8 hrs and in control group (Group B) it was 35.8±26.6 hrs respectively. The maximum ventricular rate during atrial fibrillation was slower in the amiodarone group than in the control group (103.7±20.3 beats per minute and 128.0±16.5 beats per minutes respectively). Group A patients had less hospital stay than that of Group B (placebo). There was no difference found in term of mortality between two groups (P value >0.05)

Conclusion: Perioperative oral amiodarone administration shows better results in terms of postoperative atrial fibrillation. Amiodarone group had less hospital stay than control group.

Keyword: Coronary artery bypass grafting, atrial fibrillation, oral amiodarone

INTRODUCTION

Globally, atrial fibrillation (AF) is the most common clinical disorder found in approximately in 1/3rd of patients underwent coronary artery bypass grafting (CABG). It occurs most frequently on the 2nd and 3rd postoperative day.¹⁻⁴ Advanced age and withdrawal of preoperative beta-blockers, together with postoperative sympathetic activation and a history of preoperative paroxysmal supra ventricular arrhythmia, seems to play a major role in the development of atrial fibrillation⁵. Atrial fibrillation resulted in increased duration of hospital stay and cost of management due to hemodynamic compromise or thromboembolic complications⁶. The loss of contribution of normal atrial contraction on cardiac performance. Currently different treatment protocols propound to reduce the incidence of post-operative atrial fibrillation. Multiple pharmacologic agents such as digoxin, beta-blockers, calcium-channel blockers, quinidine, magnesium and sotalolol have been applied to reduce the incidence of AF after coronary artery bypass grafting surgery⁷⁻¹². Most of these agents does not show satisfactory results to prevent the incidence rate and none of them is strongly Recommended to prevent the post-operative atrial fibrillation as a drug

of choice. Amiodarone, a class III antiarrhythmic drug with anti-adrenergic properties, has been shown to be effective in converting atrial fibrillation to sinus rhythm and in the treatment of refractory atrial fibrillation^{13,14}. Although considered to be a class III anti arrhythmic, amiodarone also has class I, II, and IV properties, which gives it a unique pharmacologic anti-arrhythmic profile.¹⁵ It can be taken orally after a high-dose preloading.¹⁶ Many of the previous studies reported the use of oral amiodarone peri-operatively shows better results in reducing the incidence of post-operative atrial fibrillation¹⁷.

We aimed to assess the efficacy of a short-course of oral amiodarone in the prevention of new-onset atrial fibrillation after CABG.

MATERIALS AND METHODS

This prospective study was conducted at the Department of Cardiac Surgery, Sandeman Provincial Hospital Quetta over a period of one year from 1st June 2017 to 31st May 2018. In this study 120 patients of both genders were included. Patient's ages ranged from 30 to 80 years. All the patients were divided into two groups, 60 patients in amiodarone group (Group A) and 60 in the control group (Group B). Detailed medical history and an informed consent were taken from all the patients. Patients with history of

Received on 18-09-2018

Accepted on 15-12-2018

chronic obstructive pulmonary disease or atrial fibrillation, and those who were not interested to participate were excluded from this study. All the patients were undergoing coronary artery bypass surgery. In group A, patients received amiodarone 400mg orally the night before surgery, 400mg orally at 5 AM on the day of surgery and 400mg BID for four days postoperatively PO/NGT. In Group B 60 patients received placebo. The data was entered and analyzed through SPSS-20.

RESULTS

All the patients were divided into two groups, 60 (100%) patients in each group. In Group A 49 (81.67%) patients were men while 11 (18.33%) patients were women with mean age 56.7±9.6 years. In Group B, 45 (75%) patients were males while 25% patients were females with mean age 58.4±7.5 years. Post-operative atrial fibrillation occurred in 7 (11.67%) patients in group A (amiodarone) while in placebo group 15(25%) patients had atrial fibrillation (p-value 0.015). In group A (amiodarone) atrial fibrillation duration was 11.7±5.8 hrs and in control group (Group B) it was 35.8±26.6 hrs respectively. The maximum ventricular rate during atrial fibrillation was slower in the amiodarone group than in the control group (103.7±20.3 beats per minute and 128.0±16.5 beats per minute (Tables 1-2).

Table 1: Demographical information of the patients

Variable	Group A (n=60)	Group B (n=60)
Gender		
Male	49 (81.67%)	45 (75%)
Female	11 (18.33%)	15 (25%)
Mean age	56.7±9.6	58.4±7.5
Body surface area	1.65±1.02	2.02±1.25
LVEF (%)	46.3±10.7	46.9±11.6
AST level (IU/L)	23.02±8.9	25.4±14.3
ALT level (IU/L)	26.6±7.3	30.1±17.5
Preoperative medication		
Beta-blockers	19 (31.67%)	14 (23.3%)
Ca-channel blocker	18 (30%)	18 (30%)
Digitalis	3 (5%)	2 (3.3%)

Table 2: Postoperative findings associated to atrial fibrillation

Atrial Fibrillation	Group A (n=60)	Group B (n=60)
Found	7 (11.67%)	15 (25%)
Not Found	53 (88.33%)	45 (70%)
AF duration (hrs)	11.7±5.8	35.8±26.6
Ventricular rate bpm	103.7±20.3	128.0±16.5

Table 3: Postoperative complications and mortality and hospital stay

Complications	Group A (n=60)	Group B (n=60)
Acute renal failure	2	1
Pulmonary complications	1	1
Wound infection	3	2
GI bleeding	2	1
Stroke	2	1
Transient neurologic deficit	-	5
Ventricular tachyarrhythmia	4	11
Hospital stay	5.9±2.6	6.8±3.7
Mortality	2 (3.33%)	3 (5%)

Postoperative complications (morbidity) were noted in 14 (23.33%) patients in Group A and 13 (21.67%) in group B. Acute renal failure requiring hemodialysis occurred in 2

patients in Group A and 1 in Group B. Pulmonary complications occurred in 1 in Group A and 1 in B. Wound infection in 3 patients in group A and 2 in B. Gastrointestinal bleeding in 2 patients in Group A and 1 in Group B. Two patients had stroke in group A while 1 in group B. Transient neurologic deficit 0 in group A while 5 in Group B. Ventricular tachyarrhythmia 4 in group A and 11 in Group B. Group A patients had less hospital stay 5.9±2.6 days than that of Group B 6.8±3.7 days [placebo] (P value 0.016). There was no difference found in terms of mortality between the two groups 2 (3.33%) in Group A and 3 (5%) in control group [p>0.05] (Table 3).

DISCUSSION

Worldwide, many advances have taken place regarding pharmacological modalities and myocardial protection but the prevalence of AF (atrial fibrillation) is still the most important cause of morbidity after CABG, and mostly affected the elderly age patients who undergo CABG^{17,18}. Advances in continuous monitoring techniques have led to more frequent diagnosis of atrial fibrillation. Our results confirm the high incidence of atrial fibrillation in patients who had CABG. Atrial fibrillation has been thought of as transient and benign, but it can lead to hemodynamic instability or peripheral embolization. Post-operative atrial fibrillation is a widely known risk factor for postoperative stroke¹⁹. Most of the studies have illustrated that the occurrence of atrial fibrillation may result from different factors such as elderly age, hypertension, chronic obstructive pulmonary disease, greater number of grafts, poor left ventricular function, preoperative beta-blocker withdrawal, and history of atrial fibrillation^{5,20,21}. Previous studies have indicated that atrial fibrillation after CABG is associated with sympathetic over activity²². Pericardial inflammation or effusion has been detected after cardiac surgery before atrial fibrillation develops²³. The incidence of postoperative atrial arrhythmia has been found to be higher in patients with a history of paroxysmal atrial fibrillation²⁴. A combination of the factors outlined above might be important in the occurrence of this complication.

In our study, the incidence of post-operative atrial fibrillation was 7 (11.67%) in group A (amiodarone) while in placebo group it was 15 (25%) (p-value 0.015). These results show similarity to some other studies in which the use of amiodarone resulted in lower prevalence of atrial fibrillation as compared to placebo^{26,27}.

Present study shows that Group A patients had less hospital stay 5.9±2.6 days than that of Group B 6.8±3.7 days (p-value 0.016). There was no difference found in terms of mortality between the two groups 2 (3.33%) in Group A and 3 (5%) in control group (p-value >0.05). These results were similar to another study in which hospital stay in the amiodarone group was shorter than the control group²⁸.

Thus we evaluated that amiodarone shows better results regarding post-operative atrial fibrillation. Moreover, we should have to do more work to reduce the morbidity and mortality rates.

CONCLUSION

After coronary artery bypass grafting surgery perioperative oral amiodarone shows better results in terms of reduction in postoperative atrial fibrillation. Amiodarone group had less hospital stay than the control group. We also observed that the prevalence of complications in both groups did not show any significant difference.

REFERENCES

- Lauer MS, Eagle KA, Buckley MJ, DeSanctis RW. Atrial fibrillation following coronary artery bypass surgery. *Prog Cardiovasc Dis* 1989;31:367-78.
- Groves PH, Hall RJ. Atrial tachyarrhythmias after cardiac surgery. *Eur Heart J* 1991;12:458-63.
- Andrews TC, Reimold SC, Berlin JA, Antman AM. Prevention of supraventricular arrhythmias after coronary artery bypass surgery. A meta-analysis of randomized control trials. *Circulation* 1991;84(Suppl):236-44.
- Hogue CW Jr, Hyder ML. Atrial fibrillation after cardiac operation: risks, mechanisms, and treatment. *Ann Thorac Surg* 2000;69:300-6.
- Ducceschi V, D'Andrea A, Liccardo B, Alfonso L, Sarubbi B, De Feo M, et al. Perioperative clinical predictors of atrial fibrillation occurrence following coronary artery bypass surgery. *Eur J Cardiothorac Surg* 1999;16:435-9.
- Creswell LL, Schuessler RB, Rosenbloom M, Cox JL. Hazards of postoperative atrial arrhythmias. *Ann Thorac Surg* 1993;56:539-49.
- Mills SA, Poole GV Jr, Breyer RH, Holliday RH, et al. Digoxin and propranolol in the prophylaxis of dysrhythmias after coronary artery bypass grafting. *Circulation* 1983;68(Suppl):II-222-5.
- Williams DB, Misbach GA, Kruse AP, Ivey TD. Oral verapamil for prophylaxis of supraventricular tachycardia after myocardial revascularization: a randomized trial. *J Thorac Cardiovasc Surg* 1985;90:592-6.
- Yilmaz AT, Demirkilic U, Arslan M, Kurulay E, Ozal E, Tatar H, et al. Long-term prevention of atrial fibrillation after coronary artery bypass surgery: comparison of quinidine, verapamil and amiodarone in maintaining sinus rhythm. *J Card Surg* 1996;11:61-4.
- Treggiari-Venzi MM, Waeber JL, Perneger TV, Suter PM, Adamec R, Romand JA. Intravenous amiodarone or magnesium sulfate is not cost-beneficial prophylaxis for atrial fibrillation after coronary artery bypass surgery. *Br J Anaesth* 2000;85:690-5.
- Gold MR, O'Gara PT, Buckley MJ, DeSanctis RW. Efficacy and safety of procainamide in preventing arrhythmias after coronary artery bypass surgery. *Am J Cardiol* 1996;78:975-9.
- Nystrom U, Edvardsson N, Berggren H, Pizzarelli GP, Radegran K. Oral sotalol reduces the incidence of atrial fibrillation after coronary artery bypass surgery. *Thorac Cardiovasc Surg* 1993;41:34-7.
- Zaremski DG, Nolan PE, Slack MK, Caruso AC. Treatment of resistant atrial fibrillation: a meta-analysis comparing amiodarone and flecainide. *Arch Intern Med* 1995;155:1885-91.
- Gosselink AT, Crijns HJ, Van Gelder IC, Hillige H, Wiesfeld AC, Lie KI. Low-dose amiodarone for maintenance of sinus rhythm after cardioversion of atrial fibrillation or flutter. *JAMA* 1992;267:3289-93.
- Doggrell SA. Amiodarone - waxed and waned and waxed again. *Expert Opin Pharmacother* 2001;2:1877-90.
- Korantzopoulos P, Kolettis TM, Galaris D, Goudevenos JA. The role of oxidative stress in the pathogenesis and perpetuation of atrial fibrillation. *Int J Cardiol* 2007; 115:135.
- Bramer S, van Straten AH, Soliman-Hamad MA, Berreklouw E, Martens EJ, Maessen JG. The impact of new-onset postoperative atrial fibrillation on mortality after coronary artery bypass grafting. *Ann Thorac Surg* 2010; 90:443.
- Kinoshita T, Asai T, Suzuki T, Kambara A, Matsubayashi K. Preoperative hemoglobin A1c predicts atrial fibrillation after off-pump coronary bypass surgery. *Eur J Cardiothorac Surg* 2012; 41(1):102.
- Almassi GH, Pecsai SA, Collins JF, Shroyer AL, Zenati MA, Grover FL. Predictors and impact of postoperative atrial fibrillation on patients' outcomes: a report from the randomized on versus off bypass trial. *J Thorac Cardiovasc Surg* 2012; 143(1):93.
- Kosmidou I, Chen S, Kappetein AP, Serruys PW, Gersh BJ, Puskas JD, et al. New-Onset Atrial Fibrillation After PCI or CABG for Left Main Disease: The EXCEL Trial. *J Am Coll Cardiol* 2018; 71:739.
- Akintoye E, Sellke F, Marchioli R, Tavazzi L, Mozaffarian D. Factors associated with postoperative atrial fibrillation and other adverse events after cardiac surgery. *J Thorac Cardiovasc Surg* 2018; 155(1): 242-51.
- Butt JH, Xian Y, Peterson ED, Olsen PS, Rørth R, Gundlund A, et al. Long-term thromboembolic risk in patients with postoperative atrial fibrillation after coronary artery bypass graft surgery and patients with nonvalvular atrial fibrillation. *JAMA Cardiol* 2018; 3(5):417-24.
- Saxena A, Dinh DT, Smith JA, Shardey GC, Reid CM, Newcomb AE. Usefulness of postoperative atrial fibrillation as an independent predictor for worse early and late outcomes after isolated coronary artery bypass grafting (multicenter Australian study of 19,497 patients). *Am J Cardiol* 2012; 109(2):219-25.
- Crystal E, Garfinkle MS, Connolly SS, Ginger TT, Sleik K, Yusuf SS. Interventions for preventing post-operative atrial fibrillation in patients undergoing heart surgery. *Cochrane Database Syst Rev* 2004; 4:CD003611.
- Kim MH, Deeb GM, Morady F, Bruckman D, Hallock LR, Smith KA, et al. Effect of postoperative atrial fibrillation on length of stay after cardiac surgery (The Postoperative Atrial Fibrillation in Cardiac Surgery study [PACS(2)]). *Am J Cardiol* 2001; 87(7):881-5.
- Arsenault KA, Yusuf AM, Crystal E, Healey JS, Morillo CA, Nair GM, et al. Interventions for preventing post-operative atrial fibrillation in patients undergoing heart surgery. *Cochrane Database Syst Rev* 2013; 1:CD003611.
- Di Nicolantonio JJ, Beavers CJ, Menezes AR, Lavie CJ, O'Keefe JH, Meier P, et al. Meta-analysis comparing carvedilol versus metoprolol for the prevention of postoperative atrial fibrillation following coronary artery bypass grafting. *Am J Cardiol* 2014; 113(3):565-9.
- Zheng Z, Jayaram R, Jiang L. Perioperative amiodarone for preventing atrial fibrillation in cardiac surgery. *N Engl J Med* 2016; 374:1744-9.