

## Frequency of Postoperative Atrial Fibrillation (POAF) in Diabetic Patients Underwent Elective Coronary Artery Bypass Grafting Surgery (CABG).

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### ABSTRACT

**Introduction:** Postoperative atrial fibrillation (AF) is a common problem after cardiac surgery with cardiopulmonary bypass (CPB). It can cause increased morbidity including stroke and need prolonged hospital stay and cost<sup>1,2</sup>.

The present study was undertaken in our local population to document the frequency of Postoperative atrial fibrillation (POAF) in diabetic patients who preoperatively had normal ejection fraction underwent elective coronary artery bypass surgery (CABG).

**Objective:** To document the frequency of Postoperative atrial fibrillation (POAF) in diabetic patients underwent elective coronary artery bypass grafting surgery (CABG).

**Material and Method:** This Descriptive case series was conducted at the department of Cardiac Surgery, Civil Hospital, Karachi from January 2019 to June 2019.

Total one hundred and four patients undergone elective, isolated, coronary artery bypass grafting surgery who have preoperative normal ejection fraction and normal serum potassium levels (4.5 – 5.5mEq/L). Patients were monitored postoperatively for four days from the day of surgery. Twelve lead ECG was done daily of all patients.

**Results:** Total one hundred and four patients included in the study with average age of 54.8±7.076 years. Eighty (76.92%) were male and 24 (23.08%) were female. Out of 52 diabetic patients, 14(26.9%) postoperatively developed AF.

**Conclusion:** In our study the frequency of Postoperative atrial fibrillation (POAF) in diabetic patients underwent elective coronary artery bypass surgery (CABG) was found to be 26.9% (14 patients).

**Keywords:** Postoperative Atrial fibrillation, Cardiopulmonary bypass, Coronary artery bypass grafting surgery, diabetes mellitus

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## 1. INTRODUCTION

Postoperative atrial fibrillation (AF) is a common problem after cardiac surgery with cardiopulmonary bypass (CPB)<sup>1</sup>. Different studies documented the frequency of development of postoperative AF as high as 12.3% - 47.4%<sup>3,4,5</sup>. It can cause increase morbidity, including stroke and also need for prolonged hospital stay and increased costs<sup>2</sup>. Incidence of postoperative AF is still very high despite advances in surgical and anesthetic techniques and postoperative care<sup>4</sup>.

Predictors of atrial fibrillations after coronary artery bypass grafting includes advanced age, preoperative withdrawal of  $\beta$ -blockers, history of myocardial infarction, hypertension, high preoperative serum creatinine level, low preoperative hemoglobin level, enlarged LA volume, low preoperative ejection fraction, chronic obstructive pulmonary disease, renal failure, combined surgeries, prolonged cardiopulmonary bypass (CPB) time, Ischemia of the atrial tissue due to aortic cross clamp, increased sympathetic activation and prolonged inflammatory response, requirement for an IABP, prolonged ventilation time, postoperative use of inotropes, postoperative renal failure, and re-operation<sup>3,5,6,7</sup>. Although AF after CABG is self-limiting in most cases, but, even when AF is uncomplicated, it requires additional medical and nursing time and prolonged hospital stay<sup>8,9</sup>.

We conducted this study in our local population to document the frequency of Postoperative atrial fibrillation (POAF) in diabetic patients who preoperatively have normal serum potassium and normal ejection fraction underwent elective coronary artery bypass.

## 2. MATERIAL AND METHOD

We conducted a descriptive case series at the department of Cardiac Surgery, Civil Hospital, Karachi from January 2019 to June 2019.

Total one hundred and four patients were included in the study by nonprobability, consecutive sampling technique. The inclusion criteria: Patients of age 40 to 70 years, of both genders, with no history of myocardial infarction, with normal serum potassium levels (4.5 – 5.5mEq/L), diabetics and nondiabetics were included in this study. Patients excluded from study were those with: Preoperative chronic atrial fibrillation or atrial flutter, surgical procedures other than CABG. Twelve-lead ECG was done preoperatively in all patients before they underwent elective, conventional CABG surgery. After surgery they were monitored and 12-lead ECG was done daily.

Approval from institutional ethical review committee was taken. The data along with demographic variables (age, gender) were collected from the patients and mention in Performa. Data was entered and analyzed in SPSS 17.0. Age was analyzed in mean  $\pm$  SD. Gender, co-morbid and presence of atrial fibrillation was analyzed in proportions and percentages. Stratification with respect to age, gender and co-morbid was done. Post stratification chi square test was applied. P value  $\leq$  0.05 was taken as significant.

## 3. RESULTS

There were one hundred and four patients included in our study who undergone coronary artery bypass grafting surgery. The average age of the patients was  $54.8 \pm 7.076$  years (figure 1). Out of 104 patients, 80 (76.92%) were male and 24 (23.08%) were female (figure 2).

Preoperative hemoglobin level was in the range of 11.2 – 12.3 gm/dl, serum potassium was 4 – 4.5mmol/l, serum creatinine was within normal range in all our patients, none of our patient had chronic obstructive pulmonary disease and 50% of patients had diabetes mellitus.

Frequency of atrial fibrillation after CABG was documented in 31(29.81%) patients which was not significant among different age groups (Chi-Square= 0.32;  $p=0.85$ ) (figure 3), it was also not significant between male and female (Chi-Square = 1.2;  $p=0.27$ ) as well as also in diabetics and non - diabetic patients. Out of 52 diabetic patients, 14 patients (26.9%) developed postoperatively AF, while in remaining 38(73.1%) patients postoperative AF not developed. Out of 52 non-diabetic patients, 17(33.3%) patients postoperatively developed AF, while in remaining 35(66.7%) patients postoperative AF not developed (Table no. 1).

FIGURE 1

### AGE DISTRIBUTION OF THE PATIENTS

n=104

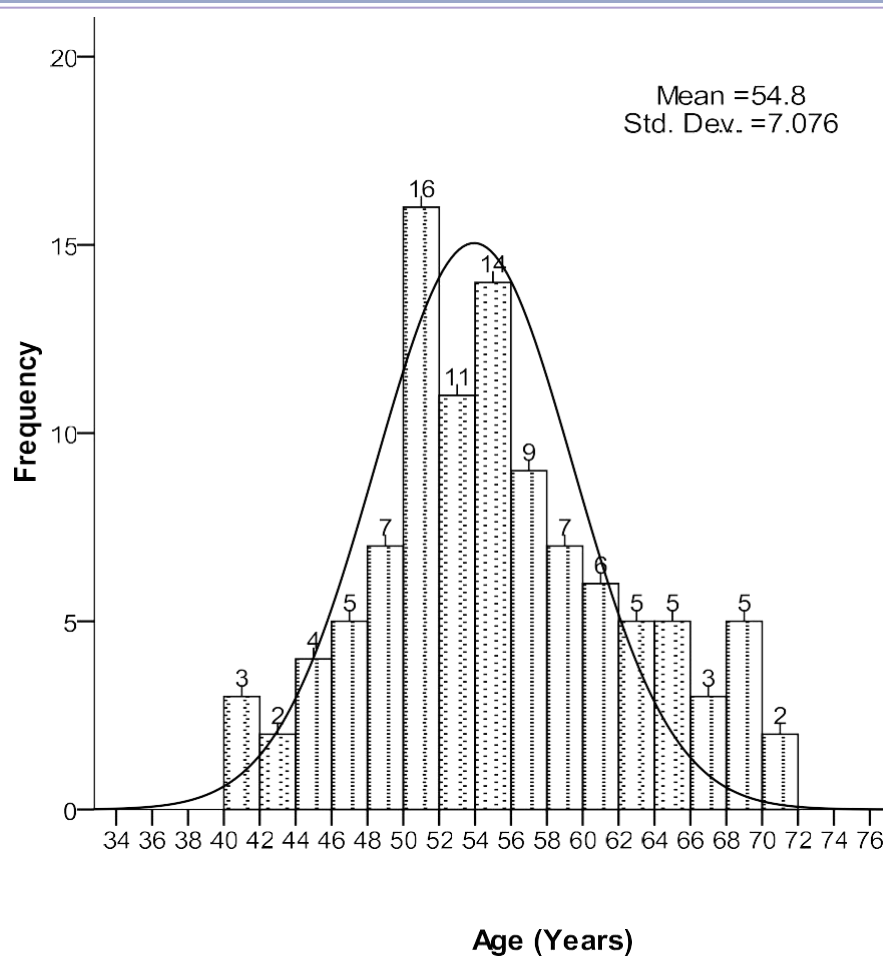


FIGURE 2 GENDER DISTRIBUTION n=104

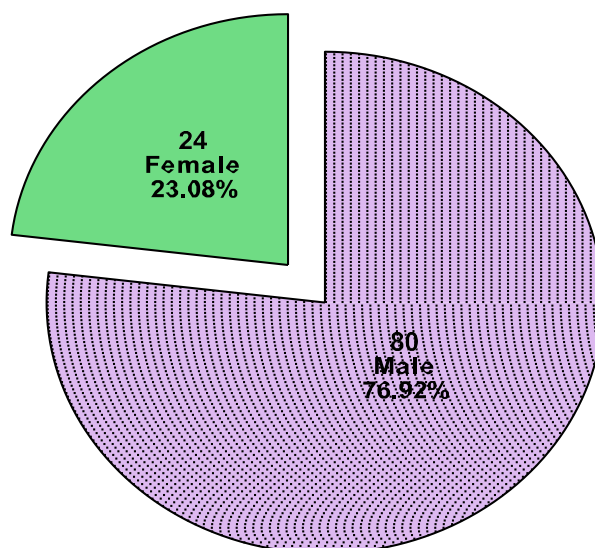
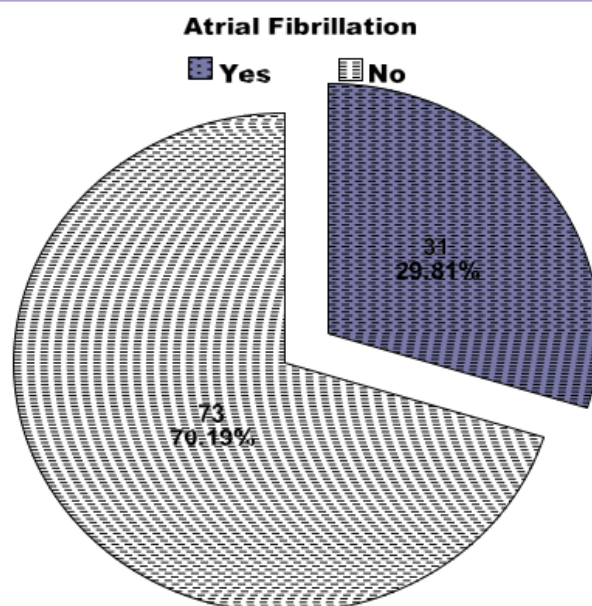


FIGURE 3 FREQUENCY OF ATRIAL FIBRILLATION AFTER CORONARY ARTERY BYPASS GRAFTING SURGERY n=104

**Atrial Fibrillation**  
**Yes**    **No**



**TABLE 1 FREQUENCY OF ATRIAL FIBRILLATION AFTER CORONARY ARTERY BYPASS GRAFTING SURGERY WITH RESPECT TO PATIENTS WITH DM**

ATRIAL FIBRILLATION			
Diabetic Mellitus			Total
	Yes n=31	No n=73	
Yes	14(26.9%)	38(73.1%)	52
No	17(33.3%)	35(66.7%)	52

Chi-Square=0.93; p=0.62

#### 4. DISCUSSION

Atrial fibrillation (AF) occurs in 20% to 40% of patients after CABG surgery. Incidence of arrhythmia has not changed, despite improvements in anesthetic and surgical techniques, but it is seen that its incidence is increasing that is most likely attributable to the increasing proportions of CABG procedures performed in elderly patients<sup>10</sup>. In our study, frequency of atrial fibrillation after CABG was found in 29.81% (31/104) patients (figure 3). Advanced age increases risk of AF in the general population as well as after CABG its risk also increases with age<sup>11,12</sup>. Dilatation and fibrosis of the atria have been shown to increase with age with a loss of side-to-side electrical coupling between groups of atrial muscle fibers<sup>10</sup>. Consequent slowing of electrical conduction within the atria provides a substrate for arrhythmogenesis<sup>13</sup>.

In our study, out of 104 patients, 31 were from 41-50 years, 53 were from 51-60 years and 20 were from 61-70 years of age group. The average age of the patients was  $54.8 \pm 7.076$  years. In contrast to most of the previous reports, these results failed to demonstrate advanced age as an independent predictor of post-operative AF<sup>14</sup>.

AF after CABG is self-limiting in most cases. Although commonly regarded as benign it may result in significant morbidity, including, palpitations, pain, fatigue, dyspnea, or generalized anxiety, congestive heart failure, renal insufficiency, prolonged ventilation, readmission to the intensive care unit, and a three to four fold increased risk of early postoperative stroke<sup>15,16</sup>. In our study, none of our patient developed heart failure, renal insufficiency, prolonged ventilation and prolonged hospital stay or stroke.

Studies documented, advanced age, enlarged LA volume, low preoperative ejection fraction, history of myocardial infarction, requirement for an IABP, combined surgeries, prolonged cardiopulmonary bypass (CPB) time and prolonged

ventilation time as predictors of atrial fibrillations after coronary artery bypass grafting<sup>6,7</sup>. In our study, we did not include patient who had history of myocardial infarction, while all patients with normal ejection fraction who underwent elective isolated CABG surgery were included in the study. In one male, nondiabetic patient age 54 years with three vessel disease required intra-aortic balloon pump (IABP) insertion to wean off from CPB. His postoperative recovery was smooth without development of atrial fibrillation. Several studies have found an increased incidence of AF among males whereas others have reported no difference<sup>10,17,18</sup>. In our study, out of 104 patients, majority of patients were male (76.92%) compare to 23.08% were female.

A study documented the incidence rate of new-onset POAF after CABG ranged between 17.3% and 47.4%. They documented following risk factors: old age, high preoperative serum creatinine level, low preoperative hemoglobin level, low left ventricle ejection fraction, chronic obstructive pulmonary disease, renal failure, postoperative use of inotropes, postoperative renal failure, and re-operation<sup>5</sup>. In our study, preoperative hemoglobin level was range between 11.2 – 12.3 gm/dl, potassium 4 – 4.5mmol/l, serum creatinine was within normal range, none of our patient had COPD. Out of 52 diabetic patients, 14(26.9%) patients developed postoperatively AF, while in remaining 38(73.1%) patients postoperative AF not developed. Out of 52 non-diabetic patients, 17(33.3%) patients postoperatively developed AF, while in remaining 35(66.7%) non-diabetic patients postoperative AF not developed (Table no 1). In our study, frequency of atrial fibrillation after CABG was not significant between diabetic and non - diabetic patients.

## 5. CONCLUSION

In our study the frequency of Postoperative atrial fibrillation (POAF) in diabetic patients underwent elective coronary artery bypass grafting surgery (CABG) was found to be 26.9% (14 patients).

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