Perioperative Risk Factors of Atrial Fibrillation post CABG Surgeries,
A Retrospective Non-Randomized Study

Thesis

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By

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List of Abbreviations

Abb.	Full term
ACC	*American College of Cardiology*
AERP	*Atrial refractory period*
AF	*Atrial fibrillation*
AFL	*Atrial flutter*
AHA	*American Heart Association*
APD	*Action potential duration*
AV	*Atrioventricular node*
BB	*Beta blocker*
BMI	*Body mass index*
CABG	*Coronary artery bypass graft*
CAD	*Coronary artery disease*
CCB	*Calcium channel blocker*
CCT	*Cross clamp time*
CHD	*Coronary heart disease*
COPD	*Chronic obstructive pulmonary disease*
CRP	*C-reactive protein*
CS	*Coronary sinus*
CV	*Conduction velocity*
DAD	*Delayed afterdepolarization*
DCC	*Direct current cardioversion*
DM	*Diabetes mellitus*
ECG	*Electro-cardiograhy*
ECM	*Extracellular matrix*
ECV	*Electrocardioversion*
EF	*Ejection fraction*
HS	*Highly significant*
HTN	*Hypertension*
PTCA	*Percutaneous transluminal coronary angioplasty*
IABP	*Intra aortic balloon pumps*
ICU	*Intensive care unit*
IVC	*Inferior vena cava*
LA	*Left atrium*

List of Abbreviations cont...

Abb.	Full term
LAD	*Left anterior descending*
LIMA	*Left internal mammary artery*
LITA	*Left internal thoracic artery*
LL	*Lower limb*
LOM	*Ligament of Marshall*
MI	*Myocardial infarction*
MIDCAB	*Minimally invasive coronary artery bypass*
OPCAB	*Off pump coronary artery bypass*
POAF	*Postoperative AF*
PV:	*Pulmonary vein*
RA	*Right atrium*
RCA	*Right coronary artery*
RIMA	*Right internal mammary artery*
RITA	*Right internal thoracic artery*
ROS	*Reactive oxygen species*
RP	*Refractory period*
SA	*Sinoatrial node*
SD	*Standard Deviation*
SPSS	*Statistical Package for Social Sciences*
SR	*Sarcoplasmic reticulum*
SVC	*Superior vena cava*
TGF	*Tissue growth factor*
TIA	*Transient ischemic attack*

INTRODUCTION

After open cardiac procedures, postoperative arrhythmias are rather common. The majority of these rhythm disturbances are supraventricular, mainly atrial fibrillation (AF) and atrial flutter. Postoperative AF has been regarded, by some, to be a benign, transient, and self-limited arrhythmia and of no consequence, as more information has accumulated through multiple studies, it has become evident that postoperative AF is a major contributing factor or marker of increasing postoperative morbidity and mortality ***(Almassi et al., 1997).***

The most common complication after cardiac surgery is atrial fibrillation (AF) and/or atrial flutter (AFL). Approximately 25-40% of patients have postoperative AF (POAF) after coronary artery bypass graft (CABG) and 50-60% after valvular surgery. The incidence of POAF is the highest in patients who have CABG and concomitant valve surgery, reaching 62%. The lowest incidence of POAF is seen in patients after heart transplant. The increasing incidence of POAF is most likely a result of the greater number of older patients having cardiac surgeries ***(Mathew et al., 2004).***

Postoperative atrial fibrillation (POAF) episodes predominantly occur on postoperative days 2-3 and 70% of all episodes occur within the first 4 postoperative days. Recurrence of POAF most often occurs on postoperative day 3. Approximately 60% of all recurrences occur within two days of

the initial episode of POAF. Nevertheless, POAF can occur at anytime after surgery. The main cause of hospital readmission after early hospital discharge following cardiac surgery is atrial fibrillation (AF) ***(Maisel et al., 2001).***

The true incidence of postoperative atrial fibrillation (POAF) following cardiac surgery is unclear. Reported incidences range from 10 - 65%. This range is wide, because studies that examined Atrial Fibrillation (AF) following coronary artery bypass graft (CABG) differ in baseline patient characteristics, type of surgery, methods of detection, and definitions of AF ***(Maisel et al., 2001).***

It is expected that the incidence will rise in the future, as the population going for cardiac surgery is getting older and the incidence of AF in general is age-dependent ***(Aranki et al., 1996; Almassi et al., 1997).***

Numerous studies have identified risk factors associated with the development of atrial fibrillation following cardiac surgery ***(Almassi et al., 1997).*** Risk factors such as older age, previous history of AF, male gender, decreased left-ventricular ejection fraction, valvular heart surgery, left-atrial enlargement, chronic obstructive pulmonary disease, chronic renal failure, diabetes mellitus, and rheumatic heart disease are associated with development of atrial fibrillation ***(Abboud et al., 2004).*** Older age may cause structural changes in the heart such as an increase in chamber size, senile cardiac amyloidosis and

fibrosis, In addition, the majority of these patients suffer from high blood pressure with secondary cardiac hypertrophy that, combined with consequent changes in myocardium, can provide a suitable substrate for generation of AF. Some studies have found an increased incidence of POAF in males, while other studies have reported no gender impact ***(Fuller et al., 1989).*** Hypertension as a major risk factor, appears to predict atrial fibrillation after cardiac surgery-and this may be related to associated fibrosis and dispersion of atrial refractoriness ***(Aranki et al., 1996).***

In the majority of patients, POAF will spontaneously convert to sinus rhythm within 24 hours after surgery. In hemodynamically stable patients, correction of predisposing factors such as hypoxia, anemia, and electrolyte imbalance, should be the first step in the management of POAF ***(Bidar et al., 2013).*** In case of haemodynamically instable patients, cardioversion to sinus rhythm by direct current (ECV) or pharmacologically with amiodarone, should be pursued. Also if patients are highly symptomatic or when rate control is difficult to achieve, electrical direct current shock is recommended ***(Members et al., 2006).***

Aim of the Work

The purpose of this study is to investigate and analyze the incidence and risk factors associated with postoperative atrial fibrillation (POAF) and its impact on intensive care unit (ICU) and postoperative hospital stay in patients undergoing coronary artery bypass graft surgeries (CABG) at Ain Shams University hospitals using the medical records of patients who underwent(CABG) surgeries from July 2018 to July 2019.

Chapter 1
ATRIAL FIBRILLATION

Definition:

Atrial fibrillation is the most common supraventricular arrhythmia characterized by fast (350-700/min), electrically uncoordinated atrial activity which causes the loss of hemodynamic effective contraction of the atria. It is associated with irregular ventricular rate ***(Tarkowski et al., 2015).*** Atrial fibrillation (AF) is a supraventricular tachyarrhythmia characterized by uncoordinated atrial activation with subsequent deterioration of mechanical function.

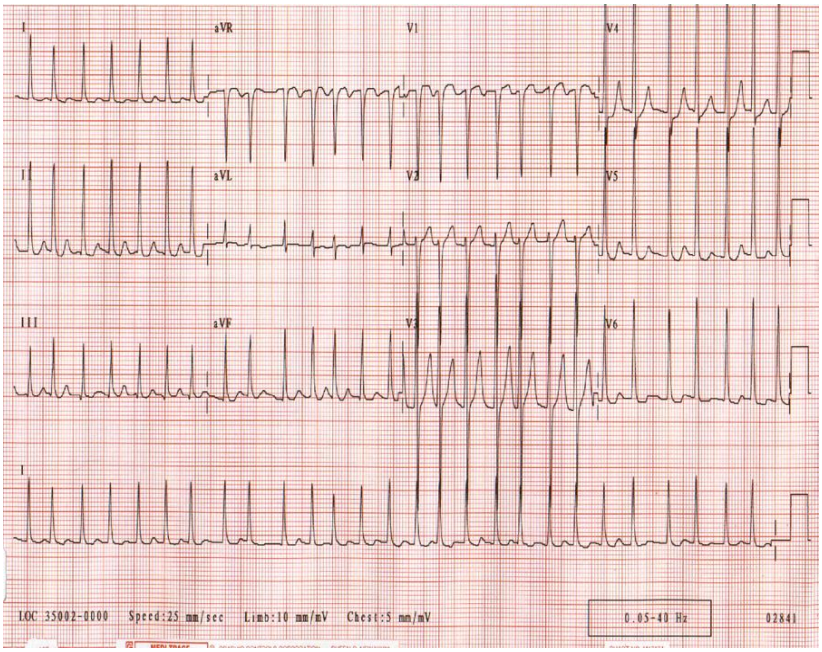

Figure 1: ECG picture of atrial fibrillation ***(Tarkowski et al., 2015)***.