Management of Atrial Fibrillation after Cardiac Surgery

Essay

Submitted for Partial Fulfillment of the Master Degree in Intensive Care Medicine

By

Ahmed Hamed Abdelfatah Ibrahim

M.B, B. Ch.

(Cairo University)

Prof. Dr. Alaa Eid Mohamed

Professor of Anaesthesia and Intensive Care and Pain Management

(Faculty of Medicine – Ain Shams University)

Dr. Amr Mohamed Abdel Fatah

Assistant professor of Anaesthesia and Intensive Care and Pain Management

(Faculty of Medicine – Ain Shams University)

Dr. Ahmed Salah Eldin Ahmed

Lecturer of Anaesthesia and Intensive Care and Pain Management

(Faculty of Medicine – Ain Shams University)

Faculty of Medicine

Ain Shams University

2014

Acknowledgement

First and foremost praise and thanks are given to **ALLAH**, who provided me, in his unlimited generosity with the medical knowledge, and by his abundant aid this work has been done.

It is a great honor to express my sincere gratitude and deep appreciation to Prof. **Dr/ Alaa Eid Mohamed** *Professor of Anesthesia and intensive care, Faculty of Medicine, Ain Shams University* who gave me the honor of working under his remarkable supervision that makes me really fortunate and who was kind to offer me much of his valuable time.

I would like also to express my deep obligation to **Dr/ Amr Mohamed Abdel Fatah,** *Assistant professor of Anesthesia and intensive care, Faculty of Medicine, Ain Shams University* for planning the subject and supervising the whole work. I will never forget his unlimited help, wise guidance and continuous support and encouragement in this thesis and also in my clinical practice.

I would like also to express my deep obligation to **Dr/ Ahmed Salah Eldin Ahmed,** *Lecturer of Anesthesia and intensive care, Faculty of Medicine, Ain Shams University* for planning the subject and supervising the whole work. I will never forget his unlimited help, wise guidance and continuous support and encouragement in this thesis and also in my clinical practice.

List of Content

List of Tables

List of Figures

List of Abbreviation

ACEIs	Angiotensin –Converting Enzyme-Inhibitor
ACS	Acute Coronary Syndrome
AF	Atrial Fibrillation
AFFRiM	Atrial Fibrillation Follow up investigation of Rhythm Managment
aPTT	Activated Partial Thrombin Time
ARB	Angiotensin Receptor Blocker
AV	Atrio-Ventricular
AVERRoES	Reduce Apixban Versus acetylsalicylic acid to Reduce the Rate of Embolic Stroke in atrial fibrillation
b.i.d	bis in die(twice daily)
BMS	Bare Metal Stent
CHA2DS2-VASC	Cardiac failure, Hypertention, Age>75 (doubled), Diabetes, Stroke (doubled), Vascular disease, Age (65-74), Sex Category female
CHADS2	Cardiac failure, Hypertention, Age, Diabetes, Stroke (doubled)
CrCl	Creatinin Clearance
CRT	Cardiac Resynchronization Therapy
CT	Computerized Tomography
CV	Cardioversion
DC	Direct Cardioversion
DCC	Direct Current Cardioversion
DIAMOND	Danish Investigation of Arrhythmia and Mortality ON Dofetilide
ECG	Electrocardiograph
ER	Extended Release formulation
GP	Ganglionic Plexi
HAS-BLED	Hypertention, Abnormal renal or liver function, Stroke, Bleeding history, Labile INR, Elderly>65, Drug or alchol.

I.V	IntraVenous
ICE	Intra Cardiac Echocardiography
ICH	IntraCranial Hemorrghe
INR	International Normalized Ratio
IVC	Inferior Vena Cava
LA	Left Atrium
LIPV	Left Inferior Pulmonary Vein
LMWH	Low Molecular Weight Heparin
LSPV	Left Superior Pulmonary Vein
LV	Left Ventricle
LVED	Left Ventricular End Diastole
LVEF	Left Ventricular Ejection Fraction
MI	Myocardial Infarction
MRI	Magnetic Resonance Imaging
N.A	Not Applicable
NA	Neuroaxial Anesthesia
NOACs	Novel Oral Anticoagulants
NYHA	New York Heart Association
o.d.	Once daily
OAC	Oral Anticoagulant
PAF	Paroxysmal Atrial Fibrillation
PCI	Percutaneous Intervention
PIAF	Pharmacological Intervention in Atrial Fibrillation
PPIs	Proton Pump Inhibitors
PT	Prothrombin Time
PT	Prothrombin Time
PV	Pulmonary Vein
PVPs	Pulmonary Vein Potentials
PVs	Pulmonary Veins
RACE	Rate Control versus Electrical cardioversion for persistant atrial fibrillation
RELY	Randomized Evaluation of Long anticoagulation therapY with dabigatran
RF	RadioFrequency
RIPV	Right Inferior Pulmonary Vein

ROCKET	Rivoroxaban Once daily oral-direct factor Xa inhibition Compared with vit K antagonism for prevention of stroke and Embolism Trial in atrial fibrillation
RRR	Relative Risk Reduction
RSPV	Right Superior Pulmonary Vein
STAF	The Strategies of Treatment of Atrial Fibrillation
SVC	Superior Vena Cava
TIA	Transient Ischemic Attack
TOE	TransOesophageal Echo
TTR	Time in Theraputic Range
UFH	UnFractionated Heparin
UH	Unfractionated Heparin
VKA	Vitamin K Antagonist

Introduction

Cardiac dysrhythmias are common during anesthesia and surgery and occur in patients with structural heart disease or normal hearts. The aggrevating factor is often physiologic imbalance unique to perioperative settings e.g. anesthetic or adjuvant drugs, adrenergic stress, acid-base and electrolyte imbalance ***(Psaty et al., 2002).***

Absolute incidence rates for postoperative atrial fibrillation vary depending on many variables, including types of procedures, patient age and comorbidities, criteria for diagnosis and methods of ECG monitoring. When diagnosed based on intermittently obtained 12 lead ECGs. Atrial fibrillation is reported in 11% of patients compared with an incidence of > 40% when Holter monitoring is employed. With a reported incidence of up to 65% after open cardiac surgery ***(Giovanni et al., 2010).***

Increased left atrial size due to valvular lesions, increased sympathetic nervous system activity or vagal tone, increased intravascular volume or perioperative hypovolemia, hypothermia, and potassium and magnesium deficiencies have all been associated with the development of atrial fibrillation ***(Christians et al., 2001).***

Coronary artery disease, cardiomegaly and premature atrial contractions were significantly associated with perioperative atrial arrhythmias in noncardiothoracic patients ***(Jennifer et al., 2010).***

Postoperative atrial fibrillation usually tends to occur within 2 to 4 days after surgery, with a peak incidence on postoperative day 2. Although postoperative AF is usually a well-tolerated, transient problem, it is associated with the need for additional treatment, prolonged hospital stay, increased costs ***(Halonen et al., 2010).***

Ventricular rate control is recommended in patients with AF without haemodynamic instability.Restoration of sinus rhythm by Direct Current Cardioversion, DCC, is recommended in patients who develop post-operative AF and are haemodynamically unstable. Current indications for curative ablation of AF are limited to patients who remain symptomatic despite the use of antiarrhythmic agents ***(Vahanian et al., 2010).***

Aim of the Work

The aim of this work is to discuss the pathophysiology and up todate in management of atrial fibrillation postcardiac surgery.

Pathophysiology of Atrial Fibrillation

Definition:

Atrial fibrilation is a supraventricular tachyarrhythmia characterized by uncoordinated atrial activation with consequent deterioration of atrial mechanical function. On the electrocardio-gram (ECG), AF is characterized by the replacement of consistent P waves by rapid oscillations or fibrillatory waves that vary in amplitude, shape, and timing, associated with an irregular, frequently rapid ventricular response when atrioventricular conduction is intact *(Figure 1,2)* ***(valentin fuster et al., 2011).***

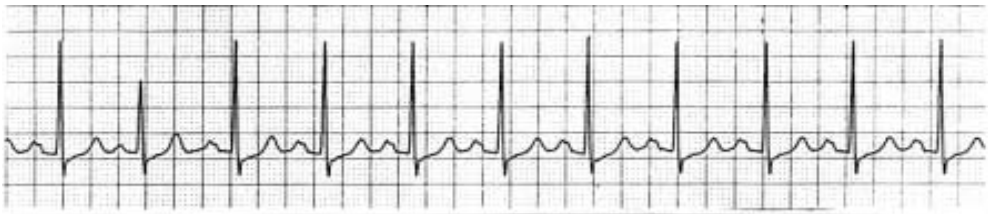

Figure (1): Normal ECG ***(valentin fuster et al., 2011).***

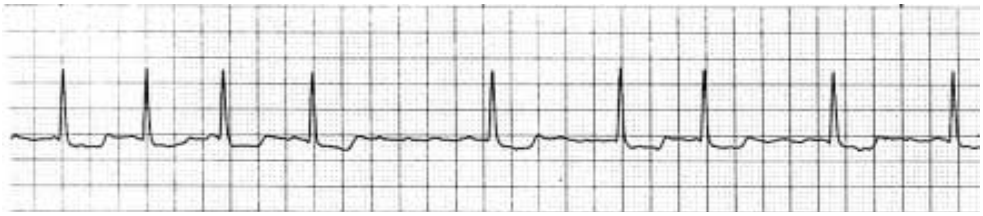

Figure (2): ECG showing atrial fibrillation ***(valentin fuster et al., 2011).***

The ventricular response to AF depends on electrophysiological properties of the AV node and other conducting tissues, the level of vagal and sympathetic tone, the presence or absence of accessory conduction pathways, and the action of drugs. Regular cardiac cycles (R-R intervals) are possible in the presence of AV block or ventricular or AV junctional tachycardia *(Figure 3)* ***(salvatore et al., 2008).***

In patients with implanted pacemakers, diagnosis of AF may require temporary inhibition of the pacemaker to expose atrial fibrillatory activity ***(valentin fuster et al., 2011).***

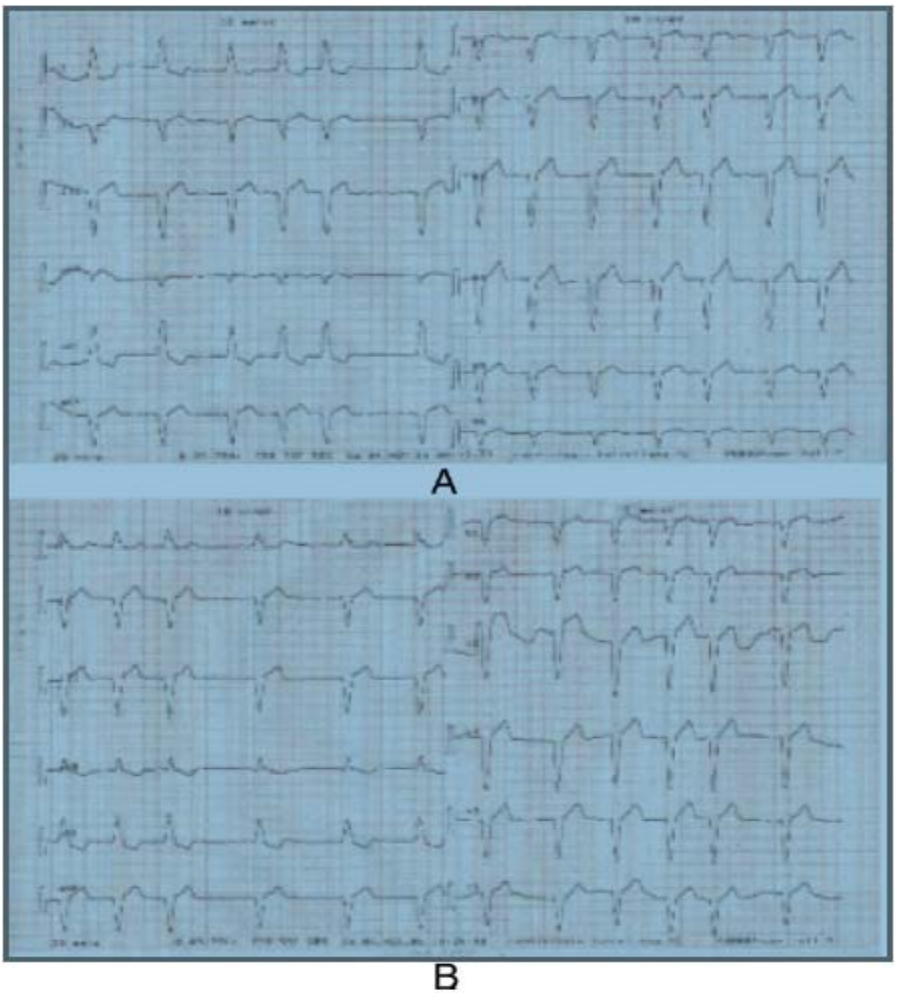

Figure (3): ECG showing atrial fibrillation with left bundle Branch block ***(Salvatore et al.,2008).***

Classification:

Various classification systems have been proposed for AF. One is based on the ECG presentation ***(Levy et al.,1998).*** another is based on epicardial ***(Allessie et al., 1994),*** endocavitary recordings or noncontact mapping of atrial electrical activity. Several clinical classification schemes have also been proposed, but none fully accounts for all aspects of AF ***(Levy, 2000).*** To be clinically useful, a classification system must be based on a sufficient number of features and carry specific therapeutic implications. Assorted labels have been used to describe the pattern of AF, including acute, chronic, paroxysmal, intermittent, constant, persistent, and permanent ***(Figure 4)***. Although the pattern of the arrhythmia can change over time, it may be of clinical value to characterize the arrhythmia at a given moment ***(Valentin fuster et al.,2001).***

The clinician should distinguish a first-detected episode of AF, whether or not it is symptomatic or self-limited, recognizing that there may be uncertainty about the duration of the episode and about previous undetected episodes.