Incidence of New onset Atrial Fibrillation among Critically Ill Elderly Patients

Thesis

Submitted for partial fulfillment of **MSc degreein Geriatrics andGerontology**

Presented by

MaramMagdyMaamounShaat

M.B., B.Ch

Supervised by

Prof. Dr.Sarah Ahmed Hamza

Professor ofGeriatrics and Gerontology

Faculty of Medicine, Ain Shams University

Dr.Safaa Hussein Ali

Assistant professor of Geriatrics and Gerontology

Faculty of Medicine, Ain Shams University

Dr.KhaledAly Abdul QaderAly

Lecturer of cardiology

Faculty of Medicine, Ain Shams University

Faculty of Medicine

Ain Shams University

2017

م

رسالة

توطئة للحصول علي درجة الماجستير في طب و صحة المسنينوعلوم الإعمار

مقدمة من

مرام مجدي مأمون شعت/الطبيبة

بكالوريوس الطب و الجراحة

تحتإشراف

أ.د/ ساره أحمد حمزه

أستاذ طب و صحة المسنين وعلوم الإعمار

كلية الطب- جامعة عين شمس

د/صفاء حسين علي

أستاذمساعد طب و صحة المسنين وعلوم الإعمار

كلية الطب- جامعة عين شمس

د/ خالد علي عبد القادر

مدرس القلب والاوعيه الدمويه

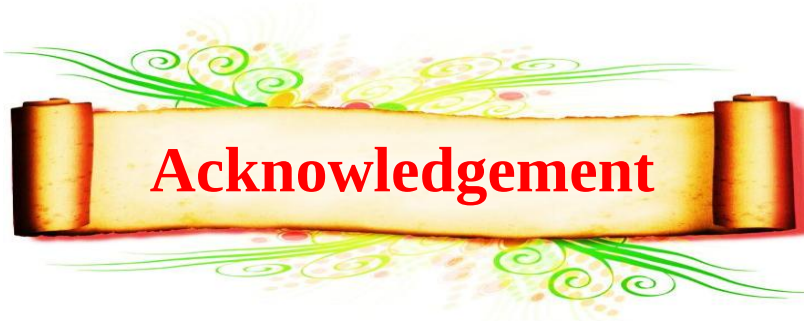
كلية الطب- جامعة عين شمس

كلية الطب

جامعة عين شمس

2017

سورة البقرة الآية: ٣٢



Acknowledgement

First and foremost thanks to ALLAH, the Most Merciful.

I wish to express my deep appreciation and sincere gratitude to ***Prof. Dr. Sarah Ahmed Hamza,*** *Professor of Geriatrics and Gerontology, Ain Shams University, for his close supervision, valuable instructions, continuous help, patience, advices and guidance. He has generously devoted much of his time and effort for planning and supervision of this study. It was a great honor to me to work under his direct supervision.*

I wish to express my great thanks and gratitude to ***Dr. Safaa Hussein Ali,*** *Assistant professor of Geriatrics and Gerontology,Ain Shams University, for his kind supervision, indispensable advice and great help in this work.*

I wish to express my great thanks and gratitude to ***Dr. KhaledAly Abdul QaderAly,*** *Lecturer of cardiology,Ain Shams University, for his kind supervision, indispensable advice and great help in this work.*

Last and not least, I want to thank all my family, my colleagues,, for their valuable help and support.

Finally I would present all my appreciations to my patients without them, this work could not have been completed.

Contents

List of Abbreviations

µg/dL	:	Micrograms per deciliter
µmol/L	:	micromoles per liter
ABG	:	Arterial blood gases
ACS	:	Acute coronary syndrome
AD	:	Alzheimer's disease
AF	:	Atrial fibrillation
Ag	:	Silver
ALT	:	Alanine amino transferase
ANS	:	Autonomic nervous system
AP	:	Action potentials
APACHE II score	:	Acute Physiology and Chronic Health Evaluation II score
As	:	Arsenic
AST	:	Aspartate amino transferase
ATP	:	Adenosine 5'-triphosphate
AV	:	Atrioventricular
BB	:	Beta blockers
BMI	:	Body mass index
BP	:	Blood pressure
BUN	:	Blood urea nitrogen:
Ca	:	Calcium
Ca	:	Calcium
CA	:	Coronary angiography
Ca	:	Calcium
CBC	:	Complete blood count
CCB	:	Calcium channel blockers
CCB	:	Calcium-channel blockers
CCB	:	Calcium channel blockers
Cells/mcL	:	Cells per microliter
CHF	:	Congestive heart failure
CK	:	Creatine kinase
CKD	:	Chronic kidney disease
Cl	:	Chloride
COP	:	Cardiac output
COPD	:	Chronic obstructive pulmonary disease

Cr	:	Chromium
CRP	:	C-reactive protein
CT scan	:	Computerized tomography
CTEPH	:	Chronic thromboembolic pulmonary hypertension
Cu	:	Copper
Cu/Zn-SOD	:	Copper /Zinc superoxide dismutase
CVS	:	Cerebrovascular stroke
DBP	:	Diastolic blood pressure
DD	:	Diastolic dysfunction
DM	:	Diabetes mellitus
DNA	:	Deoxyribonucleic
DPG	:	Diphosphoglycerate
E-C	:	Excitation contraction
ECG	:	Electrocardiography
Echo	:	Echocardiogram
ESRD	:	End-stage renal disease
Fe	:	Iron
FL	:	Femtoliters
GCS	:	Glasgow Coma Scale
GFR	:	Glomerular filtration rate
GGT	:	Gamma-glutamyltransferase
GRACE risk score	:	Global Registry of Acute Coronary Events
GSH-Px	:	Glutathione peroxidase
HF	:	Heart failure
HGB	:	Hemoglobin
HPI	:	History of present illness
HTN	:	Hypertension
I	:	Iodine
ICU	:	Intensive care unit
IL-6	:	Interleukin-6
INR	:	International normalized ratio
ISHD	:	Ischemic heart disease
JVP	:	Jugular venous pressure
K	:	Potassium
LA	:	Left atrium

LAD	:	left atrial diameter
LDL	:	Low-density lipoprotein
LVD	:	Left ventricular dysfunction
LVEF	:	Left ventricular ejection fraction
LVF	:	Left ventricular failure
LVH	:	Left ventricular hypertrophy
MAT	:	Multifocal atrial tachycardias
MCV	:	Mean corpuscular volume
mEq/L	:	Milliequivalent per liter
Mg	:	Magnesium
mg/dL	:	Milligrams per deciliter
MI	:	Myocardial infarction
mm Hg	:	Millimeter mercury
mmol/L	:	Millimoles per Liter
Mn	:	Manganese
Mo	:	Molybdenum
MRI	:	Magnetic resonance imaging
MS	:	Milliseconds
MV	:	Mitral valve
Na	:	Sodium
NAFLD	:	Non-alcoholic fatty liver disease
Na-K-ATPase	:	Sodium-potassium-adenosine triphosphatase
Ni	:	New York Heart Association
NYHA	:	Nickel
P	:	Phosphorous
Pb	:	Lead
PD	:	Parkinson's disease
PE	:	Pulmonary embolism
PH	:	Pulmonary hypertension
PND	:	Paroxysmal nocturnal dyspnea
PT	:	Prothrombin time
PTT	:	Partial thromboplastin time
QOL	:	Quality of life
RA	:	Right atrium
RAAS	:	Renin–angiotensin–aldosterone system
RNA	:	Ribonucleic acid

ROS	:	reactive oxygen species
RR	:	Respiratory rate
RV	:	Right ventricular
RVD	:	right ventricular dysfunction
RVSP	:	Right ventricular systolic pressure
S	:	Sulfur
SA	:	Sinoatrial
SBP	:	Systolic blood pressure
SD	:	Standard deviation
Se	:	Selenium
SIRS	:	Systemic inflammatory response syndrome
SO2	:	Sulfur dioxide
SPSS statistics	:	Statistical Package for Social Sciences
STEMI	:	ST-segment elevation myocardial infarction
SVT	:	Supra ventricular tachycardia
T3	:	Triiodothyronine
T4	:	Thyroxine
TE	:	Trace elements
TLC	:	Total leucocytic count
TR	:	Tricuspid regurgitation
TrxRs	:	Thioredoxinreductase
TSH	:	Thyroid-stimulating hormone
U/L	:	Units per liters
VF	:	Ventricular fibrillation
Vtach	:	Ventricular tachycardias
WBCs	:	White blood cells
Zn	:	Zinc

List of Table

List of Figures

Introduction

Atrial fibrillation (AF) is the most common arrhythmia observed in whole population with an incidence of 0.5%, increasing to 1% above 75 years ***(Reinelt et al., 2001)***. It has been well established that incidence AF in ICU is increased and is associated with a high morbidity and mortality ***(Seguin et al., 2004)***.

The mean age of patients with AF is 75 years, and approximately 70% of affected patients are between the ages of 65 and 85 years. It is clear that the prevalence of AF increases with age ***(Go et al., 2001)***.

Elderly patients are more likely to have comorbid illnesses including hypertension, congestive heart failure, and left ventricular hypertrophy, placing them at increased risk for thromboembolic complications with AF and antithrombotic therapy complications ***(Kamanthand Lip, 2002)***. Age-related degenerative changes in the cardiac conduction system predispose the elderly to sick sinus syndrome and tachycardia–bradycardia syndrome ***(Berry et al., 2003)***.The age-related pharmacologic and pharmacodynamic changes in the antiarrhythmic drugs increase the predilection for side effects and pro-arrhythmias***(Fang et al., 2007)***.

One of the most important risk factors is existing heart disease. Atrial fibrillation is common among those with coronary heart disease, valve disease, angina, congestive heart failure, recent heart surgery, atherosclerosis diabetes, hypertention, thyroid problems bronchial asthma pulmonary embolism, emphysema, COPD, obstructive sleep apnea, It can also happen to healthy people, especially when they are stressed or fatigued, have had too much caffeine or alcohol, smoker, and increase or decrease of some minerals, such as calcium, magnesium, or potassium. ***(Maisel et al., 2001)***

Trace elementsare elements that are required in amounts between 1to 100 mg/dayby adults. They are required in the body for its normal function especially through various enzymes, hormones, vitamins etc, where they are the important components. These elements includeCalcium, Chromium, Colbalt, Copper, lodine, Iron, magnesium, Manganese, Molybdenum, Phosphorous**,** Potassium**,** selenium, Sulfur, zinc, lead, silver and nickel.***(O'Dell BL and Sunde, 1997)***

Trace elements may contribute to myocardial dysfunction and susceptibility of the phospholipid cell membrane to free-radical damage and oxidative changes, Trace elements such as copper, cobalt, and arsenic may contribute to myocardial dysfunction and Zinc deficiency may increase the susceptibility of the phospholipid cell membrane to free-radical damage and oxidative changes.

Magnesium is an important determinant of the resting membrane potential of cardiac cell membranes, potassium regulates heart beats.***(Ying-Qun Yanet al., 2013)***

As the proportion of the elderly in the general population grows, the number of elderly patients being admitted to the intensive care unit (ICU) is also increasing ***(Nguyen et al., 2011)***. The proportion of patients older than 80 years out of total ICU admissions in various developed countries has been estimated as being between 7 and 25 % and growing ***(Nathanson et al., 2011)***.

Age is generally thought to be strongly associated with intensive care outcomes, but this relationship may be confounded by acute physiological impairment, age-related changes (lower functional reserve, co-morbidity) and differences in intensive care practice. Elderly patients frequently suffer from one or more severe chronic illnesses before hospitalisation and are less able to meet the physiological demands of critical illness**. *(Boumendil et al., 2004)***

With populations aging, AF is likely to become a greater public health burden, and thus reliable incidence figures are needed ***(Kannel et al., and Am Cardiol, 1998)***, So the aim of the study is to explore the relation between atrial fibrillation incidence and the changes in serum electrolyte concentrations in intensive care unit.

Aim of the work

To measure incidence rate of atrial fibrillation in elderly patients admitted to ICU and its possible risk factors.