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ACUTE HEART FAILURE IN ICU

Essay

Submitted for partial fulfillment of master degree of critical care medicine

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Ain Shamas University
Faculty of Medicine
2013

كلية الطب – جامعة عين شمس

قسم التخدير والرعاية المركزة

فشل عضلة القلب الحاد داخل العناية المركزة

مقدمة رسالة

توطئة للحصول على درجة الماجستير في العناية المركزة

مقدمه من

الطبيب / علاء عبد العليم عبد العزيز قناوي

بكالوريوس الطب والجراحة – جامعة المنوفية

تحت إشراف

الأستاذ الدكتورة / ساميـــــه إبراهيــم شـــرف

أستاذ التخدير والعناية المركزة
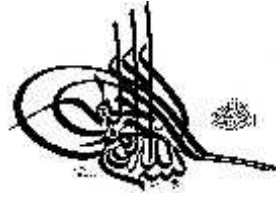
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الدكتورة / سنـــــاء فـرج محمـود

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قالوا سبحانك لا علم لنا إلا ما علمتنا

إنك أنت العليم الحكيم

صدق الله العظيم

سورة البقرة – آية ٣٢

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LIST OF ABBREVIATIONS

ACC	American College of Cardiology
ACE	Angiotensin-converting enzyme
Ach	Acetylcholine
ACS	Acute Coronary Syndrome
AF	Atrial fibrillation
AHA	American Heart Association
AHFS	Acute Heart Failure Syndrome
AMI	Acute Myocardial infarction
ANP	A trial Natriuretic Peptide
AT$_1$	Angiotensin type 1
AT$_2$	Angiotensin type 2
ATP	Adenosine triphosphate
BNP	Brain Natriuretic Peptide
BP	Blood pressure
CAD	Coronary artery disease
CCU	Coronary care unit
cGMP	Cyclic guanosine monophosphate
CMA	Cardiac myosin activators
CNP	C-type natriuretic peptide
CNS	Central nervous system
CPAP	Continuous positive airway pressure
CSA	Central sleep apnea
CT	Computed tomography

CT	Computed tomography
CXR	Chest x-ray
DBP	Diastolic blood pressure
E	Epinephrine
ECG	Electrocardiogram
ECM	Extracellular matrix
ED	Emergency Department
EF	Ejection fraction
ESC	European Society of Cardiology
ETT	Endotracheal intubation
Fio$_2$	Fraction of inspired oxygen
HF	Heart Failure
h-UCN2	peptide human urocortin 2
ICDs	Implantable cardiac defibrillators
IVC	Inferior vena cava
JVP	Jugular venous pressure
LA	Left atrium
LV	Left Ventricle
LVH	Left Ventricle hypertrophy
MIBG	Metaiodobenzylguanidine
MRI	Magnetic resonance imaging
NE	Norepinephrine
NIPPV	Noninvasive intermittent positive-pressure ventilation

NIV	Non-invasive ventilation
NO	Nitric oxide
NOS	Nitric oxide synthase
NP	Natriuretic Peptide
NT-proBNP	N-terminal pro Brain Natriuretic Peptide
NYHA	New York Heart Association
O$_2$sat	Oxygen saturation
PAC	Pulmonary artery catheters
PCWP	Pulmonary capillary wedge pressure
PEEP	Positive end-expiratory pressure
RA	Right atrium
RAAS	Renin-angiotensin-aldosterone system
RAS	Renin-angiotensin system
ROS	Reactive oxygen species
RV	Right Ventricle
S3	Third heart sound
S$_4$	Fourth heart sound
SBP	Systolic blood pressure
SERCA2a	Sarcoendoplasmic reticulum Ca2+
SERCA-2a	Sarcoendoplasmic reticulum Ca^{2+}-ATPase type 2a
sGC	Soluble guanylate cyclase
SL	Sublingual
SNS	Sympathetic (adrenergic) nervous system

UF	Ultrafiltration
-AR	-adrenergic receptors
c	Circumferential wall stress
m	Meridional wall stress

ACKNOWLEDGEMENTS

First of all my deepest gratitude and extreme thanks to Allah the Most Greatful, the Most Merciful.

I would like to express my thanks, appreciation and profound gratitude to Professor *Dr.* **Samia Ibrahim Sharaf** , Professor of Anaesthesiology & Intensive Care, Faculty of Medicine, Ain Shams University, for her kind supervision, careful guidance, endless patience, great effort and continuous help throughout the course of this work.

I would like also to express my everlasting gratitude and sincere thanks to *Dr.* **Sanaa Farag Mahmoud** , Lecturer of Anaesthesiology & Intensive Care, Faculty of Medicine, Ain Shams University for her valuable advice, endless support, kind supervision, continuous encouragement and generous help throughout the whole work.

I wish to thank *Dr.* **Hend Youssef Mohammed Ali**

Lecturer of Anaesthesiology & Intensive Care, Faculty of Medicine, Ain Shams University, for her great help, suggestions, efforts, encouragement and support helped to put this work in its final shape.

Finally, my deepest thanks and gratitude are due to my father and mother for the considerable patience they have shown and the great care they have given so as to smooth the rough edge of this work.

Wishing this work be beneficial in the medical field, I hope it will satisfy you all.

Introduction

Acute Heart Failure Syndrom (AHFS) is defined as gradual or rapid change in heart failure signs and symptoms resulting in a need for urgent therapy. These symptoms are primarily the result of severe pulmonary congestion due to elevated left ventricular filling pressures (with or without low cardiac output). AHFS can occur in patients with preserved or reduced ejection fraction .

Concurrent cardiovascular conditions such as coronary heart disease , hypertension, valvular heart disease, atrial arrhythmias, and/or noncardiac conditions (including renal dysfunction, diabetes, anemia) are often present and may precipitate or contribute to the pathophysiology of this syndrome *(Remme WJ and Swedberg K.,2001).*

The combination of the aging of the population in many countries, and improved survival after acute myocardial infarction has created a rapid growth in the number of patients currently living with chronic heart failure ,with a concomitant increase in the number of hospitalizations for decompensated heart failure.

Coronary heart disease is the aetiology of AHF in 60–70% of patients, particularly in the elderly population. In younger subjects, AHF is frequently caused by dilated cadiomyopathy, arrhythmia, congenital or valvular heart disease, or myocarditis *(McCullough PA et al .,2002).*

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Introduction

Advanced heart failure and related acute decompensation have become the single most costly medical syndrome in cardiology. Patients with AHF have a very poor prognosis. Mortality is particularly high in patients with acute myocardial infarction accompanied by severe heart failure, with a 30% 12 month mortality.Likewise, in acute pulmonary oedema a 12% in-hospital and 40% 1 year mortality have been reported.About 45% of patients hospitalized with AHF will be rehospitalized at least once (and 15% at least twice) within twelve months *(Berry C et al.,2001).*

AHF can present itself as acute de novo (new onset of acute heart failure in a patient without previously known cardiac dysfunction) or acute decompensation of chronic heart failure*(Cleland JG et al .,2003).*

The patient with acute heart failure may presentAcute decompensated heart failure (de novo or as decompensation of chronic heart failure), Hypertensive AHF,Cardiogenic shock, High output failure ,Right heart failure.

AHF is a clinical syndrome, with reduced cardiac output, tissue hypoperfusion, increase in the pulmonary capillary wedge pressure (PCWP), and tissue congestion. The underlying mechanism may be cardiac or extra-cardiac, and may be transient and reversible with resolution of the acute syndrome, or may induce permanent damage leading to chronic heart failure *(Fox KF et al .,2001).*

The clinical AHF syndrome may be classified as predominantly left or right forward failure, left or right backward failure, or a combination of these.

The diagnosis of AHF is based on the symptoms and clinical findings, supported by appropriate investigations such as ECG, chest X-ray, biomarkers, and Doppler echo cardiography *(Krumholz HM et al.,1998).*

The immediate goals of treatment are to improve symptoms and to stabilize the haemodynamic condition. An improvement in haemodynamic parameters only may be misleading, however, and a concomitant improvement in symptoms (dyspnoea and/or fatigue) is generally required. These short-term benefits must also be accompanied by favourable effects on longer-term outcomes. This is likely to be achieved by avoidance, or limitation, of myocardial damage.

Mangment include medical therapy like :Oxygen and ventilatory assistance,diuretics,vasodilators, Anticoagulation, Angiotensin converting enzyme Inhibitors, *b*-blocking agents, Inotropic agents.

Or Mechanical assist devices and heart transplantation (Intra-aortic balloon counterpulsation, Ventricular assist devices, Heart transplantation) *(Krumholz MH P et al .,2001).*