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شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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"New Onset of Atrial Fibrillation" As An Outcome Predictor in Critically Ill Patients with Sepsis: A Systemic Review

Thesis submitted For partial
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List of Contents

Title **page**

List of Abbreviations i

List of Figures ii

List of Tables iii

Introduction 1

Aim of the study 5

Review of Literature 6

Patient and Methods 45

Results 48

Discussion 60

Conclusion 67

Summary 68

References 71

Arabic summary ..... ---

List of Abbreviations

AF	: Atrial fibrillation
CRP	: C - Reactive Protein
EGDT	: Early Goal Directed Therapy
HR	: Heart rate
ICU	: Intensive Care Unit
LV	: Left ventricle
NAD	: Noradrenaline
NMR	: Nuclear Magnetic Resonance
NOACs	: New oral Anticoagulants
NOAF	: New onset Atrial Fibrillation
NOSVA	: New onset Supra Ventricular Arrhythmia
NVAF	: Non-Valvular AF
PAWP	: Pulmonary Artery Wedge Pressure
q SOFA	: Quick Sequential Organ Failure Assessment Score
SIRS	: Systemic Inflammatory Response Syndrome
SOFA	: Sequential Organ Failure Assessment Score
SV	: Supra Ventricular
TEE	: Trans esophageal echocardiography
TTE	: Trans thoracic echocardiography
TNF_á	: Tumor necrosis factor-alpha

List of Figures

Fig.	Title	Page
1	Probability of new-onset AF during the 7 first days of septic shock (Kaplan-meier curve)	9
2	Antiarrhythmic therapy	27
3	The pooled proportion of ICU mortality	53
4	The pooled proportion of In-hospital mortality	55
5	The pooled proportion of 1year mortality	57
6	The pooled proportion of incidence of ischemic stroke	59

List of Tables

Table	Title	Page
1	SOFA criteria	1
2	Quick SOFA (q SOFA)	2
3	Systemic inflammatory response syndrome (SIRS)	7
4	Definitions of chronic co-morbidities, ICU measurements, and treatment to asses the risk of NOAF	18
5	Scoring differences between $CHADS_2$ and CHA_2DS_2-VASC	39
6	HAS-BLED Score	41
7	$HEMORR_2HAGES$ Score	42
8	ATRIA Score	43
9	Overview of included studies	49
10	Incidence of NOAF in patients with various stages of sepsis	51
11	ICU mortality of NOAF in patients with sepsis	52
12	In-hospital mortality in patients with NOAF and sepsis	54
13	1 year mortality in patients with NOAF and sepsis.	56
14	Incidence of ischemic stroke with NOAF in patients with sepsis	58

Introduction

Sepsis represents a major public health problem. The incidence of sepsis vary widely due to differences in case ascertainment, ranging from 66 to 300 per 100000 population in the developed world. Mortality estimates for sepsis range from 27% to 36%; however, the risk of death from sepsis has been falling over recent decades despite the increasing incidence, perhaps due to improvements in care (**Kumar et al., 2010)**.

Sepsis is now defined as 'life threatening organ dysfunction caused by dysregulated host response to infection'. The clinical diagnosis of sepsis is based on a patient having infection and a raised Sequential Organ Failure Assessment Score (SOFA) Table (1), with a change in score of 2 or greater from baseline being diagnostic (**Singer et al., 2016)**.

Table (1): *SOFA criteria* (Singer et al., 2016).

SOFA Criteria				
Points	1	2	3	4
RESPIRATION PaO_2/FiO_2	<400	<300	<200	<100
COAGULATION Platelet Count	<150	<100	<50	<25
LIVER FUNCTION Bilirubin (mg/dL)	1.2 – 1.9	2.0 – 5.9	6.0 – 11.9	>12.0
CARDIOVASCULAR Hypotension	MAP <70	Dopamine ≤5 or dobutamine (any dose)	Dopamine >5 or epinephrine ≤0.1 or norepinephrine ≤0.1	Dopamine >15 or epinephrine >0.1 or norepinephrine >0.1
NEUROLOGIC GCS	13 – 14	10 – 12	6 – 9	<6
RENAL Creatinine/UOP	1.2 – 1.9	2.0 – 3.4	3.5 – 4.9 or UOP <500 mL/day	>5.0 or UOP <200 mL/day

Table (2): ***Quick SOFA (q SOFA)*** **(Seymour et al., 2016)**.

Parameters	**Criteria**
Respiratory Rate	≥22 breaths / min
Altered Mentation	GCS<15
Systolic blood pressure	≤100 mmHg

The q SOFA score is a bedside prompt that may identify patients with suspected infection who are at greater risk for a poor outcome outside the intensive care unit. It uses three criteria, assigning one point for low blood pressure **(**SBP≤100 mmHg), high respiratory rate (≥22 breaths per min), or altered mentation (Glasgow coma scale<15) (**Seymour et al., 2016)**.

Atrial fibrillation (AF) is the most common type of cardiac arrhythmia, the prevelance of AF is also increasing (**Iwasak et al., 2011)**.

In AF, the upper chambers of the heart do not function correctly as a result of abnormal electrical signaling **(Falk et al., 2001)**.

It is characterised by rapid and irregular atrial depolarisations with a discrete lack of P waves on electrocardiograms. As a result, the blood in the atria remains static and can promote blood clot formation and increase the risk of stroke **(Copley et al., 2016).** This can cause detrimental symptoms, impair functional status and reduce the quality of life (**Gutierrez et al., 2011)**.

In recent times, advancements in medical technology have helped us gain a greater understanding of AF and the mechanisms of its onset. As a result, many novel pharmacological and non pharmacological therapies have been developed that can control or potentially prevent AF (**Menezes et al., 2013)**.

Evidence of various cardiac arrhythmias in septic patients has been demonstrated by multiple clinical reports and observations **(Goodman et al., 2008)**. Most cardiac arrhythmias in sepsis are new-onset and may be related to sepsis-induced myocardial dysfunction, autonomic dysfunction and, most likely also, by impairment and involvement of the cardiac conduction system (**Christian et al., 2008)**.

However, abnormalities of the cardiac conduction system in sepsis have not been well described so far. Both sepsis induced myocardial dysfunction and sepsis-induced cardiac arrhythmias are related to high intensive care unit (ICU) mortality and increased risk of acute stroke (**Meierhenrich et al., 2010)**.

The clinical significance of recurrent acute AF in septic patients with pre-existing cardiac comorbidities, which can be complicated and triggered by severe systemic inflammatory reaction is poorly understood (**Sato et al., 2015)**.

Although cardiac arrhythmias in general ICU population have been described since the early 1990s

(Annane et al., 2008), most authors have studied unselected cohorts of patients, with neither exclusion of subjects who had a cardiac reason for admission nor those with a known history of chronic or paroxysmal AF. As a consequence, the true incidence and prognosis of new-onset AF (NOAF) in patients presenting with sepsis remains unknown (**Artucio et al., 1990)**.

If AF causes poor outcome it might be desirable to start antiarrhythmic prophylaxis in critically ill patients with sepsis in an attempt to prevent this complication. Current guidelines advise the use of beta blockers or amiodarone to prevent postoperative AF in patients following cardiac surgery, and it is conceivable that a preemptive strategy could also be effective in patients with (severe) sepsis. Identification of patients at highest risk for AF is therefore important. We aimed to gain better understanding of the incidence, risk factors and outcomes of NOAF in critically ill patients with sepsis **(Bradley et al., 2005)**.

Aim of the work

To describe the incidence of NOAF and to determine the risk factors associated with its development, as well as its clinical course and its effect on the outcome of patients with sepsis admitted to the ICU.

Review of Literature

Epidemiology:

Most septic patients who developed NOAF were in septic shock. Pneumonia was shown to be the most likely source of infection in septic patients with new AF (**Christian et al., 2008)**.

NOAF occurred more in elderly patients those with a prior history of cardiovascular and respiratory disease, and those with increased severity of illness. One study suggests that in the ICU setting, rhythm control may be desirable due to the increased mortality rate among those unable to achieve sinus rhythm**(Meierhenrich et al.,2010)**.