



شبكة المعلومات الجامعية
التوثيق الإلكتروني والميكرو فيلم

بسم الله الرحمن الرحيم



MONA MAGHRABY



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شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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Neutrophil Gelatinase-associated Lipocalin as a Biomarker for Predicting Acute Kidney Injury After Coronary Artery Bypass Grafting

Thesis

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List of Abbreviations

ACE: angiotensin converting enzyme

ACx: Aortic cross clamping

ADQI: Acute disease quality initiative

AKI: Acute kidney injury

AKIN: Acute kidney injury network

ARBs: Angiotensin receptor blocker

ARF: Acute renal failure

ASA: American Society of Anesthesiologist

AUC: Area under the curve

CABG: Coronary artery bypass grafting

CAD: Coronary artery disease

CIN: Contrast induced nephropathy

CKD: Chronic kidney disease

CPB: Cardiopulmonary bypass

CRS: Cardiorenal syndrome

CSA-AKI: Cardiac surgery-associated acute kidney injury

CVP: Central venous pressure

FDA: Food and drugs administration

GDT: goal directed therapy

GFR: Glomerular filtration rate

HR: Heart rate

ICU: intensive care unit

KDIGO: Kidney Disease: Improving Global Outcomes

LVEF: Left ventricular ejection fraction

MAP: Mean arterial pressure

NAC: N-acetylcysteine

NGAL: Neutrophil gelatinase-associated lipocalin

NSAID: Non-steroidal anti-inflammatory

OPCAB: Off pump Coronary artery bypass

PRBCS: Packed red blood cells

RCT: Randomized controlled trial

RIFLE: Risk, Injury, Failure, Loss of kidney function, and End-stage kidney disease

RIPC: Remote ischemic preconditioning

ROC: Receiver operating characteristic

ROS: Reactive oxygen species

RRT: Renal replacement therapy

SCr: Serum creatinine

TEA: Thoracic epidural analgesia

UOP: urine output

(Cont.)

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Introduction

Acute kidney injury is a frequent complication after cardiac surgery. According to the literature and the various definitions of acute kidney injury, cardiac surgery associated kidney injury may concern 1% to 30% of the patients. Mortality raises from 1% up to 50% for patients who undergo renal replacement therapy following cardiac surgery (*Thiele et al., 2015*).

Early detection of renal dysfunction is often presented as a “holy grail” because it could allow interventions (both diagnostic and therapeutic) to prevent evolution to renal failure (*Bataille et al., 2017*).

Serum creatinine reflects the balance between the synthesis of creatinine and its excretion by the kidney. Creatinine production in the body varies with muscle mass, physical activity, protein intake, and catabolism while creatinine excretion is dependent on the glomerular filtration rate (GFR). The serum creatinine and GFR are inversely and exponentially related. Halving of GFR implies that there will be doubling of creatinine concentration. There are several limitations for creatinine as a marker of kidney injury in acute perioperative situations. However, it has a poor,

predictive accuracy for kidney injury, particularly in the early stages of AKI (*Mcilroy & Sladen, 2015*).

Neutrophil gelatinase-associated lipocalin (NGAL) is an iron-transporting glycoprotein which accumulates in the kidney tubules and urine after nephrotoxic and ischemic insults. This glycoprotein increases 3–4-fold within 2–3 h and up to 10,000-fold by 24 h of renal insult. NGAL has been proposed as an early, sensitive, noninvasive biomarker for AKI. NGAL measured in the immediate postoperative period is an excellent predictor of AKI following adult cardiac surgery (*Jain et al., 2016*).

In this study we measured both NGAL and serum creatinine to predict renal adverse outcomes in patients undergoing elective CABG.

Aim of the study

The aim of this study is to determine serum neutrophil gelatinase-associated lipocalin (NGAL) as a biomarker in predicting AKI in patients undergoing coronary artery bypass grafting(CABG).

Chapter one:

Acute Kidney Injury after Coronary artery bypass graft surgery

Complicated cardiac surgery and major non-cardiac surgery are associated with significant morbidity and mortality and strong correlation exists between the development of in-hospital complications and survival. One of these is acute kidney injury (AKI) which is independently associated with morbidity and mortality in a wide range of surgical settings (*O'Connor et al., 2016*).

Acute kidney injury (AKI) is a condition that is characterized by a sudden deterioration of kidney function as indicated by a reduced glomerular filtration rate (GFR). cardiac surgery is considered the second most common cause of AKI in the intensive care unit (ICU) (*Mao et al., 2013*).

Moreover, postoperative AKI is associated with long-term adverse events including chronic kidney disease and late mortality. Furthermore, even in cases of apparent recovery of renal function at hospital discharge, persistent decrease of glomerular filtration rate (GFR) with respect to