



شبكة المعلومات الجامعية  
التوثيق الإلكتروني والميكرو فيلم

# بسم الله الرحمن الرحيم



**MONA MAGHRABY**



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التوثيق الإلكتروني والميكروفيلم



# شبكة المعلومات الجامعية التوثيق الإلكتروني والميكروفيلم



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# جامعة عين شمس

## التوثيق الإلكتروني والميكروفيلم

### قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها  
علي هذه الأقراص المدمجة قد أعدت دون أية تغييرات



### يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



**MONA MAGHRABY**



**The Immediate and Short term Outcomes of  
Patients with ST Elevation Myocardial  
Infarction with High Thrombus Burden  
receiving Intracoronary Verapamil versus  
Epinephrine during Primary Percutaneous  
Coronary Intervention**

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

# قَالَ

سَبَّحَانَكَ لَا إِلَهَ إِلَّا مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ  
الْعَلِيمُ الْعَظِيمُ

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# *List of Abbreviations*

Abb.	Full term
2D .....	Two dimensional
ACS.....	Acute coronary syndrome
ARBs .....	Angiotensin receptor blockers
CABG.....	Coronary artery Bypass Grafting
CCBs.....	Calcium channel blockers
CCU .....	Coronary care unit
CFR.....	Coronary flow reserve
CMR.....	Cardiac magnetic resonance
CNR .....	Coronary no reflow
CVD .....	Cardiovascular disease
DAPT .....	Dual antiplatelet therapy
DES.....	Drug eluting stents
ECG .....	Electrocardiography
EMS .....	Emergency medical services
FFR.....	Fractional flow reserve
GP .....	Glycoprotein
HTN .....	Hypertension
IMR.....	index of microcirculatory resistance
IVUS .....	Intravascular ultrasound
LAD .....	Left anterior descending
LAO .....	Left anterior oblique
LCX.....	Left circumflex artery
LGE .....	Late gadolinium enhancement
LVEF .....	Left ventricular Ejection fraction
MACE.....	Major adverse cardiac events
MBG .....	Myocardial blush grade
MI .....	Myocardial infarction
MRI.....	Magnetic resonance imaging
MVO .....	Microvascular obstruction



## *List of Abbreviations Cont...*

Abb.	Full term
NSTEMI .....	Non-ST-segment elevation MI
OM .....	Obtuse marginal
p.o. ....	Per os
PCI.....	Percutaneous Coronary Intervention
PET.....	Positron emission tomography
PPCI .....	Primary percutaneous coronary intervention
RCA .....	Right coronary artery
SBP .....	Systolic blood pressure
SCAD.....	Spontaneous coronary artery dissection
SPECT.....	Single-photon emission computed tomography
STEMI .....	ST elevation myocardial infarction
TFG.....	TIMI flow grade
TIMI .....	Thrombolysis in Myocardial Infarction
TMPG .....	TIMI myocardial perfusion grade
UFH.....	Unfractionated heparin

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# INTRODUCTION

ST elevation myocardial infarction is caused by total thrombotic coronary artery occlusion, most of our treatment strategies focused on epicardial coronary arteries yet little interest was given to microvascular occlusion and its consequences. When a coronary artery is occluded, detrimental changes occur in the cardiac capillaries and arterioles. After relief of the occlusion, blood flow to the ischemic tissue may still be impeded, a phenomenon known as no reflow. This study attempts to provide an in-depth understanding of this phenomenon from the laboratory bench to the clinical arena and different solutions attempted at reversing it.

Several researches were performed on the coronary circulation specifically on dogs, dogs were subjected to 40 or 90 minutes of proximal coronary artery occlusion. When the coronary occlusion was relieved after 40 minutes of occlusion, the blood flow was restored to the damaged myocardium as assessed by markers of perfusion such as thioflavin S and carbon black. However, after 90 minutes of coronary occlusion, there was only partial restoration of blood flow to the myocardial tissue, despite virtual elimination of the coronary occlusion. Anatomic perfusion defects were prominent in the subendocardial myocardium when thioflavin S or carbon black was injected into the vasculature after restoration of epicardial coronary flow. Electron microscopic examination of the cardiac

microvasculature within the anatomic no-reflow zones revealed significant capillary damage in the form of swollen endothelium and intraluminal endothelial protrusions and, less commonly, intraluminal platelets and fibrin thrombi. These changes, coupled with interstitial and myocardial cellular edema, could compress the capillaries and be responsible for the no-reflow phenomenon. The longer ischemia lasts, the more likely the no-reflow phenomenon is to occur. Microvascular damage did not appear to be the primary cause of myocardial cell damage because the no-reflow area appeared to be confined to areas of tissue that were already necrotic (*Reimer et al., 2007*).

The no-reflow phenomenon is becoming increasingly recognized because of the spread of primary intervention for acute myocardial infarction and the emergence of contrast myocardial echocardiography. With the clinician focusing on both epicardial coronary arteries and the microvasculature, there is a need for a safe and effective treatment for no reflow. After prolonged cessation of coronary occlusion and restoration of blood flow to the epicardial coronary arteries, there is sufficient structural damage to the microvasculature to prevent restoration of normal blood flow to the cardiac myocytes. This may lead to inadequate healing of the cardiac scar. In addition, it may prevent the development of future collateral flow (*Reimer et al., 2007*).

Treating no reflow may not necessarily reduce the size of myocardial infarction because the microvascular damage is usually confined well within the zone of myocardial necrosis. However, treating no reflow may enhance the delivery of blood and blood-borne elements to the necrotic area, thus speeding healing (*Agati et al., 2001*).

Various agents have been used in management of coronary no reflow with controversial result in different studies, the most used is adenosine and verapamil, other agents also have been tried as nicorandil, sodium nitroprusside, nitroglycerine, and adrenaline and no agent of choice yet favorable in restoring the microcirculation (*Nazir et al., 2016*).



## **AIM OF THE STUDY**

This study is a single center randomized controlled trial designed to compare between the standard treatment strategy with two other strategies, one is adrenaline and the other is verapamil regarding the immediate and short term outcomes in patients presenting with ST elevation myocardial infarction (STEMI) with high thrombus burden during primary percutaneous coronary intervention (PPCI).