IMPACT OF STRESS MYOCARDIAL PERFUSION IMAGING ON THE OUTCOME OF PATIENTS WITH ACUTE MYOCARDIAL INFARCTION

Thesis Submitted to Fulfillment of
Master Degree In Cardiology

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رسالة مقدمة لنيل درجة الماجستير
في أمراض القلب والأوعية الدموية

مقدمة من الطبيب

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سُبْحَانَكَ لاَ عِلْمَ لَنَا إِلاَّ مَا عَلَّمْتَنَا إِنَّكَ أَنْتَ العَلِيمُ الحَكِيمُ

صدق الله العظيم

(سورة البقرة- آية ٣٢)

ACKNOWLEDGEMENT

Before all, I would like to express my deep thanks to ***Allah****, without his great blessings; I would never accomplish this work.*

My deepest thanks and most sincere gratitude to ***Prof. Dr. Amr Adel El-Sayed****, Professor of Cardiology, Ain Shams University, for his close supervision, generous guidance, enlightening suggestions and creative ideas. I consider myself very fortunate and I'm proud to have worked under his supervision.*

I'm deeply grateful to ***Dr. Ahmed Ahmed Khashaba****, Assistant Professor of Cardiology, Ain Shams University, for his valuable instructions and critical mind that brought out the final points of my research and opened new paths of thoughts which were formerly closed.*

I want to thank ***everyone help me*** *to accomplish this work. Lastly I would like to dedicate this work to* ***my parents, my lovely wife and my sweaty son Yosuf****.*

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Introduction

Acute myocardial infarction (AMI) is defined as death or necrosis of myocardial cells. It is a diagnosis at the end of the spectrum of myocardial ischemia or acute Coronary syndrome (ACS) myocardial infarction (MI) occurs when myocardial ischemia exceeds a critical threshold and overwhelms myocardial cellular repair mechanisms that are designed to maintain normal operating Function and homeostasis. Ischemia at the critical threshold level for on extended time Period results in an irreversible myocardial cell damage or death . The most Common etiology of MI is a thrombus Superimposed on a ruptured or unstable atherosclerotic plaque ***(Ryan TL et al, ١٩٩٩).***

Myocardial infarction (MI) is the leading Cause of death in the United States (US) as well as in most industrialized nations through the world . Approximately ٨٠٠,٠٠٠ people in US are affected and in spite of a better awareness of presenting symptoms. ٢٥٠,٠٠٠ die prior to presentation to hospital. the survival rate of US patients hospitalized with MI is approximately ٩٠٪ to ٩٥٪. This represents a significant improvement in survival and is related to improvement in the survival and is related to improvements in emergency medical response and treatment strategies. In general MI can occur at any age. The actual incidence is dependent upon predisposing risk factors for atherosclerosis ***(Grines CL et al ١٩٩٣).***

Stress Technithium scintigraphy (TC) is a useful modality in screening of coronary arty disease (CAD) ***(Kumar et al, ٢٠٠١).***

The first descriptions of what today be recognized as Viable myocardium appeared in ١٩٧٠s, when it was observed that ventricular dysfunction reverted of revascularization in some patients with antecedents of AMI. The concept of viability is the apposite of that necrosis, which implies an

irreversible alteration in contractility in patients with sever ventricular dysfunction of ischemic origin, revascularization leads to improvement in ventricular function, survival and prognosis. The assessment of residual viability in the infracted area after an AMI is related to subsequent management and prognosis ***(Eitzman D et al, ١٩٩٢).***

Nuclear imaging in cardiology has an integral role in the non-invasive detection of CAD, assessment of myocardial viability, and stratification of risk. It imparts improved sensitivity and specificity over standard exercise testing. The average sensitivity of single photon emission computed tomography (SPECT) with $TC^{٩٩m}$ is reported to ٩٠٪ and the average specificity is ٧٤٪. Nuclear imaging can provide functional, physiologic and prognostic information, is quantifiable and reproducible, and is Readily obtainable in diverse patient population. Myocardial perfusion imaging may aid in diagnosis and risk stratification for patients with acute coronary syndrome ***(Topal and Marso text book: Nuclear Imaging***, ٥٧٨ - ٩٠***).***

Infarct size is a major determinant of the prognosis is of patients with an AMI. Early perfusion (within few hours) and sustained patency of the occluded artery by thrombolytic therapy limit the infarct size and thereby preserve left ventricular function and improve survival. Infarct size and left ventricular function are associated with the extent and duration of myocardial ischemia ***(Karel GM Moons et al, ١٩٩٩).***

Aim of the study

To evaluate the impact of results of stress myocardial perfusion imaging on the outcome of cases of AMI.

Patients and Methods:

Patients:

Inclusion criteria :

(٤٠) patients well be included with AMI during (٢) weeks From admission to C.C.U. and after complete stabilization.

Exclusion criteria

A) Patients with left bundle branch block (LBBB) .

B) Patients with other heart diseases as rheumatic heart valve diseases

C) Patients refusing to participate in the study .

Methods

After taking informed consent from the patient, all patients undergo:

I - Full history taking with emphasis on

١. Risk factors as: smoking habits, DM, hypertension, hypercholesterolemia, and family history of CAD.

٢. Time elapsed from the onset of symptoms of AMI to hospital arrival.

٣. Mode of perfusion, if present, thrombolytic therapy as streptokinase or percutanous coronary intervention (PCI)

II- Resting ١٢ leads E.C.G.

prove and localize the infarction .

III- Stress TC ٩٩ m scintigraphy:

- To localize site of infarction, size of infarction and viability in the infarction zone.
- The imaging will be used for all patients within ١٥ days from their admission to C.C.U. and after complete stabilization.
- A dose of(٢٢ -٣٠) mCi of $TC^{٩٩m}$ is injected through an indwelling intravenous canula, according to separate two days protocol.
- The radiotracer will be injected at peak of exercise and the exercise continue one minute after.
- Patients unable to exercise, dobutamine infusion (as a pharmacological exercise tasting) will be used.
- Tomographic images will obtained using a rotatory circular head gamma camera interfaced to a computer.
- Recording results of imaging for such a case for :-
  * ischaemia (present or not)
  * viability (present or not).
  * infarction size.

IV- Follow up of such case :

For occurrence of another AMI, ACS or sudden death up to ٣ months.

V- These data will be tabulated and statistically analyzed.

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احتشاء عضلة القلب هو عبارة عن نخر عضلة القلب الناتج عن عدم التوازن الحرج بين حاجة عضلة القلب للأكسجين والكميات الواردة إليها وهو ما ينتج عن تكون الخثرات في الشرايين.

ويعد احتشاء عضلة القلب السبب الأهم للوفيات في الولايات المتحدة الأمريكية ومعظم الدول الصناعية حيث تصل نسبة الوفيات حوالي من ٦-١٠% من هؤلاء المرضى ويعد هذا تحسناً ملحوظاً وهو مرتبط بالتحسن في الاستجابة الطبية السليمة للحالات الحرجة وكذلك استراتيجيات العلاج.

وعموماً فإن احتشاء عضلة القلب يحدث في أي سن ولكن يزداد بازدياد السن بالإضافة إلى عوامل الخطورة الأخرى مثل التدخين، وارتفاع ضغط الدم، ومرض البول السكري، وارتفاع نسبة الدهون والكوليسترول في الدم....الخ.

إن مستقبل تحسن حالة المصاب باحتشاء عضلة القلب قد تطور بتطور إعادة الإرواء والجهد المبذول لإزالة عوامل الخطورة.

والمسح الذري لعضلة القلب بالتكنيشيوم ٩٩ له دور مساعد في تشخيص أمراض الشرايين التاجية كما أنه يعطي معلومات وظيفية وفسيولوجية وتنبؤ بالمضاعفات المستقبلية بالإضافة إلى تحديد عوامل الخطورة.

إن أهمية هذه الدراسة تأتي من تناول موضوع الجزء الحي وسط العضلة المصابة بالإحتشاء وحجمه وما لذلك من أهمية في تحديد نوع العلاج والتنبؤ المستقبلي بالمضاعفات التي يمكن أن يصاب بها المريض.