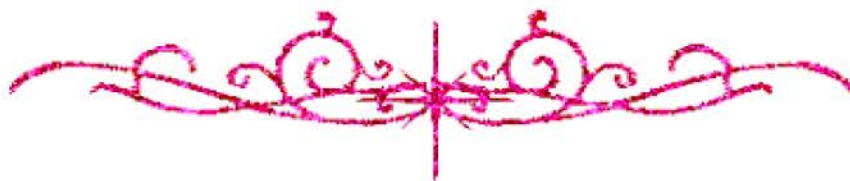


# بسم الله الرحمن الرحيم





# شبكة المعلومات الجامعية التوثيق الالكتروني والميكروفيلم



# جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

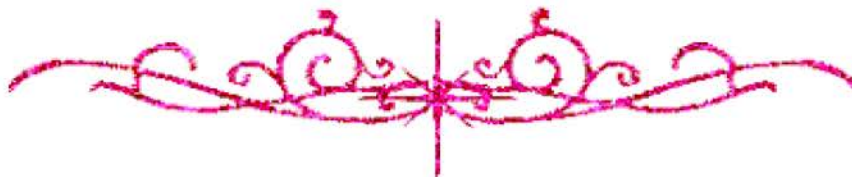
## قسم

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



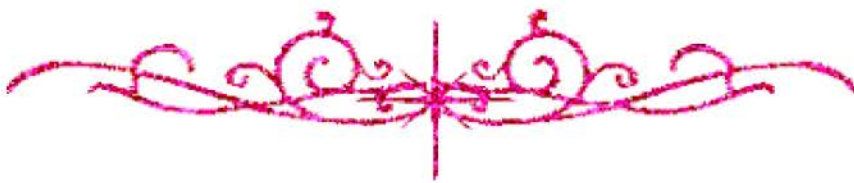
## يجب أن

تحفظ هذه الأقراص المدمجة بعيدا عن الغبار



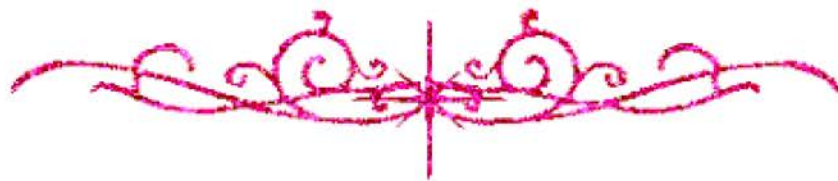


# بعض الوثائق الأصلية تالفة





بالرسالة صفحات  
لم ترد بالأصل



MINIA UNIVERSITY  
FACULTY OF MEDICINE  
CARDIOLOGY DEPARTMENT

B1V119

***Validity of exponential  
exercise protocol and Q-T  
dispersion in detecting  
myocardial ischemia***

Thesis submitted in partial fulfillment for the master degree in cardiology

By

**Abd Allah Younes Abd Allah  
MB.B, CH**

Supervised by

**Pro. Dr. Samir Said Abdul-Kader  
Professor of internal medicine &  
cardiology  
Faculty of medicine  
Assiut University**

**Dr. Nasser Mohammed Taha  
Assistant Pro. of cardiology  
Faculty of medicine  
Minia University**

**Dr. Khaled Abdul-Ghany Baraka  
Assistant Pro. of cardiology  
Faculty of medicine  
Minia University**

2000-2001

**"بسم الله الرحمن الرحيم"**

**"وعلمك ما لم تكن تعلم وكان فضل  
الله عليك عظيما"**

صدق الله العظيم  
(سورة النساء - من الآية ١١٣)

***To my beloved family  
this work is heartily  
dedicated***

## **ACKNOWLEDGMENT**

First and foremost thanks to GOD the most kind and merciful.

I am greatly to express my deepest gratitude and thanks to my **Professor Dr. Samir Said Abdul-Kader**, Professor of internal medicine & Cardiology, Faculty of Medicine, Assiut university, for his careful supervision, kind encouragement, faithful support and unlimited help, as well as, his inexhaustible efforts during the fulfillment of this work.

I would like to express my deepest thanks and appreciation to **professor Dr. Nasser Taha** Assistant Professor & head of Cardiology department, Faculty of Medicine, Minia University for his constant help and guidance, and for his deep insights that solved all problems encountered during the make of this work, as well as his valuable opinions and enthusiasm that helped much this work to come to light. without which this work would have never been conceived.

I am really indepted to **professor Dr. Khaled Baraka** Assistant Professor of Cardiology, Faculty of Medicine, Minia University, for his sincere help, kind supervision constructive criticism and truthful guidance. He helped with his time and mind and to his systematized thought. I owe of much of this work plans.

I would like to express my thanks to all my collages, the member of the cardiology department in El-Minia University for their help and encouragement.

Finally, My deepest thanks and appreciation to my father and the Sault of my mother for their continuous patience and support not only although this work, but also although my life.

Last but not least, my appreciation and profound thanks go to my wife for her continuous understanding and moral support although this work.

## ***Introduction***

Since decades stress testing is being employed for evaluation of all cardiovascular functions.

Many exercise protocols particularly Bruce protocol are in use in clinical cardiology, but no single test is applicable to all patients due to the wide range of exercise capacity. A new protocol (standardized exponential exercise protocol, STEEP) was devised to achieve this goal. Safety and applicability of this protocol has been tested (**Northridge et al., 1990**).

QT dispersion is useful tool for detection of repolarization abnormalities and predicts the risk for ventricular arrhythmia.

## ***Aim of the work***

The aim of this work is to reevaluate the safety, applicability and validity of the exponential exercise protocol in IHD and evaluate the QT dispersion as a parameter of ischemia during exercise protocols.



***Part one***

***Review of  
literature***

## CHAPTER ONE

# ***STRESS TESTING***

Coronary artery disease (CAD) remains a leading cause of morbidity and mortality despite advances in emergency care and intervention. Detection of patients with occult CAD before acute myocardial infarction or sudden death is a major challenge in contemporary cardiology (**Marcovitz et al, 1993**).

Major efforts have been expanded to develop accurate, reliable and cost effective methods for detecting ischemic heart disease (IHD). For more than 3-decades, assessment of electrocardiographic ST-Segment changes during exercise has been the standard non-invasive method because of its simplicity and relatively low cost. However, stress electrocardiography suffers from well-known deficiencies in both sensitivity and specificity as well as its limitation in patients with physical limitations (**Ginzton, 1989**).

Stress Thallium scanning and stress echocardiography have emerged as cost effective non-invasive techniques in detecting CAD. However, the radionuclide technique has important drawbacks. Likewise, stress echocardiography is of limited value in patients unable to perform adequate exercise or those handicapped by musculoskeletal, neurological or peripheral vascular diseases (**Stratmann and Kennedy, 1989**).

Pharmacological stress tests, specifically Dobutamine stress echocardiography, have gained much popularity in recent years (**Bach & Armstrong, 1992**).

## FORMS OF STRESS

Numerous forms of stress have been used in conjunction with different ways of imaging (electrocardiography, echocardiography, radionuclide). These include:

1. Exercise:

- a) Treadmill exercise
- b) Supine bicycle ergometry
- c) Upright bicycle ergometry

2. Pacing:

- a) Transvenous atrial pacing
- b) Esophageal atrial pacing
- c) Post ventricular pacing

3. Pharmacological:

- a) Dobutamine
- b) Dipyridamole
- c) Adenosine
- d) Isoproterenol
- e) Epinephrine

4. Others

- a) Mental stress
- b) Cold pressor test
- c) Isometric exercise (Handgrip)
- d) Arm ergometry

## ***EXERCISE STRESS TESTING***

Exercise, a human being's most common physiologic stress, Can bring out cardiac abnormalities not present at rest. For this reason, exercise can be considered the most practical test of cardiac function. It adds information to that obtained in the clinical assessment of the cardiac patients and helps the clinician perform diagnostic and prognostic assessment (**Froelicher, 1987**).

Exercise stress testing (ET) is an inexpensive noninvasive tool that provides valuable cardiopulmonary information in healthy and diseased populations. It is most commonly used for diagnosing coronary artery disease (CAD) and developing appropriate exercise prescription (EP). With its widespread use and application, it is imperative that safe and appropriate guidelines and procedures are used, as there are a number of risks associated with testing in a population with or suspected of having CAD. The focus should be on the patient's safety: personnel must be properly trained and aware of all emergency procedures, contra-indications for ET and indications for test termination must be strictly adhered to. Three main types of exercise testing are prevalent: sub-maximal, maximal and maximal utilizing gas exchange. The maximal test is most commonly used, and the sub-maximal is appropriate for hospitalized patients. Gas exchange data is essential when assessing congestive heart failure and timing for heart transplantation. Exercise test is commonly performed using a treadmill or a bicycle ergometer. The treadmill provides a more familiar exercise modality and has been shown to have greater diagnostic sensitivity than the bicycle ergometer; It is, however, more expensive and requires more space in the testing room. The bicycle ergometer is more appropriate for those individuals who are severely obese or have problems with extended periods of walking. Regardless of the modality, an appropriate exercise protocol

---

should be used. In North America, the Bruce protocol is the most common. However, the Bruce protocol and other protocols that estimate the exercise capacity based on equations, tend to overestimate exercise capacity. They may be too demanding for those with limited exercise capacity, and too long for those with high exercise capacity. For these people, an exercise protocol that reaches maximal capacity in 8 to 12 minutes using smaller increments in workload should be considered. Once completed, the results of ET need to be correctly interpreted. This includes reviewing the test results while considering the patient's history and indication for the test. Exercise test can also be used to develop an exercise protocol (EP) for the participant. An EP should take into account the intensity and modality of exercise, frequency and duration, as well as being realistic for the individual and the goals to be achieved. All the information from the test results and the pre-test examination should be presented in a report that also includes the advised EP. **(Lear et al, 1999).**