

REPRODUCIBILITY OF THE RESULTS OF TREADMILL EXERCISE TEST IN PATIENTS WITH POSITIVE TEST

Thesis

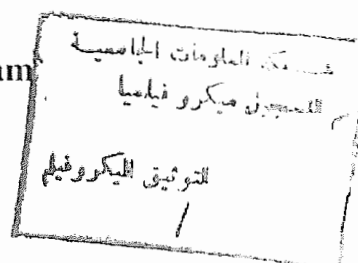
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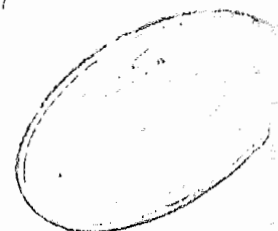
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LIST OF TABLES

	Page
Table (1): Sensitivity and specificity of 0.1mv ST depression induced by exercise as determined from relatively bias free investigations	(9)
Table (2): Muscle metabolism prior to, during and after exercise	(51)
Table (3): Statistical data showing comparison of performance of paired exercise test subsequent to first one group	(64)
Table (4): Bruce protocol	(76)
Table (5): Personal history of the patients	(83)
Table (6): Data collection from the first test	(84)
Table (7): Data collection from the second test	(85)
Table (8): Mean and standard deviation of different data collection	(86)

LIST OF FIGURES

Page

- Fig. (1): The information content of the exercise induced ST changes and its relation to disease prevalence and methods of reporting(11)
- Fig. (2): Glucose metabolism at rest, during exercise and recovery(50)
- Fig. (3): Insulin binding to crude membrane of the soleus muscle from sedentary and acutely exercised rats(55)
- Fig. (4): Relationship of percent change of walking time in minutes to end point of 3+ angina between TA and TB to the original walking time in group of patients(63)
- Fig. (5): difference in the mean time walking between first and second exercise test(87)
- Fig. (6): Difference in the mean time walking at onset of angina between 1st and 2nd exercise(88)
- Fig. (7): difference in the mean exercise unit between first and second exercise test(89)
- Fig. (8): Difference in the mean rate X blood pressure at stop between 1st and 2nd exercise test(90)
- Fig. (9): difference in the mean arrhythmia between first and second exercise test(91)

CONTENTS

	Page
INTRODUCTION	(1)
AIM OF THE WORK	(2)
REVIEW OF LITERATURE	(3)
SUBJECT AND METHOD	(74)
RESULTS	(79)
DISCUSSION	(92)
SUMMARY	(100)
CONCLUSIONS	(101)
REFERENCES	(102)
ARABIC SUMMARY.	

INTRODUCTION

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Accurate follow up of disease progression and evaluation of medical therapy and different therapeutic interventions in patients with I.H.D. requires a reliable quantitative method to measure the change in functional capacity and cardiac status.

Exercise test has been long used for this purpose. Follow-up exercise test is routinely used following different therapeutic intervention to evaluate the amount of improvement gained from such interventions. Any improvement in the exercise performance or ischaemia assuming that the results of the first test should be reproducible in the second test.

Day to day variations in exercise performance unrelated to any change in the cardiac status of the patient should be considered. An effect to patient familiarity with the test on serial performance is also expected.

AIM OF THE WORK

AIM OF THE WORK

In this study we will try to detect the changes in parameters of the treadmill test done by ischemic coronary diseased patients when the test is repeated with 2-9 days interval. We will try to detect whether there would be an improvement in the performance of the patients to the second test or not, in the form of total duration of exercise test and time walked by patients till the onset of angina. Also we will try to detect any change in the haemodynamics between the two tests in the form of comparison between heart rate, blood pressure and heart rate pressure product at onset of angina and at the end of exercise test.

The study will try to detect whether there will be a change in the incidence of occurrence of arrhythmia in the second test or not.

Finally, we will try to will detect any changes in Mets between the two tests and whether these changes will be significant or not.

REVIEW OF LITERATURE

INDICATION AND CONTRAINDICATION OF EXERCISE TREADMILL TEST

Indication of exercise test:-

I. Diagnosis of patients with chest pain or other cardiac findings:-

Evaluation of exercise testing as diagnostic test for coronary disease depends on the population tested which must be divided by independent techniques into those with and those without disease. Coronary angiography and follow-up for coronary events are two methods of separating a population into those with and those without coronary disease.

Sensitivity and specificity are the terms used to define how reliably a test distinguishes diseased from nondiseased individuals. Sensitivity is the percentage of abnormal test result in those with the disease. Specificity is the percentage of times that a test gives a normal results when those without the disease are tested (1-2).

What is an abnormal ST response:

Most of the tests for the diagnosis of coronary artery disease including the exercise test have a considerable overlap of the range of measurements for the normal

population and for those with coronary disease. Therefore problems arise when a certain cut-point value is used to separate these two groups (i.e. 1mm of ST segment depression). if the value is set too high (i.e. 0.2m.v. of ST segment depression) in order to identify nearly all the normal subjects as being free of disease giving the test high specificity. Then a substantial number of those with the disease are called normal.

If the value is chosen too low i.e. 0.05 m.v. ST segment depression that identifies nearly all those with disease as being abnormal giving the test high sensitivity. However nearly without disease are also identified as abnormal. The sensitivity and specificity of exercise induced ST segment depression can be demonstrated by analysis the results obtained when exercise testing and coronary angiography have been used to evaluate patients. It appears that the exercise test cut-point of 0.1m.v. horizontal or downsloping ST segment depression has approximately a 79% specificity for angiographically significant coronary artery disease. These results also indicate a 68% sensitivity for 0.1 m.v. ST segment depression. From these, results indicated that exercise induced ST segment of 0.1 m.v. is very specific and somewhat sensitive indicator of severe coronary disease. There may be normal or mildly disease coronary

arteries in patient with greater than this amount of depression. The reasons for this inconsistency are related to biases in the studies. There are two types of biases.

Selection bias:-

1- Patients with prior myocardial infarction who are known to have coronary disease by resting E.C.G. abnormalities. Since their diagnosis is known there is no indication for diagnostic exercise testing in these subjects. Though they might undergo exercise testing for other reasons.

2- Some of these studies included healthy asymptomatic young volunteers (controls) who did not undergo coronary angiography. Their inclusion falsely raises specificity because these are the most normal of the normal.

3- Many of these protocols excluded subjects liable to have false positive results e.g. (hypertensive patients with mitral prolapse) although these subjects are frequently tested with exercise E.C.G. for the diagnosis of coronary disease.

4- All of these studies were done by retrospectively reviewing the record of patients who had undergone both coronary angiography and exercise E.C.G for clinical reason. In most of these subjects, the exercise test results had

influenced the decision to perform angiography. This would show the test results towards both true and false positive. Since patients testing positively are more liable to undergo invasive catheterization, sensitivity would be falsely raised and specificity falsely lowered. This has been called work up bias by Philich (1-3).

The second bias was (review bias):

The exercise test results were reviewed without knowledge of angiographic findings. However most of these investigators neglected to blind the readers of coronary argiograms to exercise test results. This diagnostic review bias would falsely raise both senitivity and specificity.

Recently there is attempt to avoid these biases in investigating the sensitivity and specificity of diagnostic tests e.g. randomly chosen patient already refered and scheduled for angiography can undergo exercise test as part of research protocol without allowing the test results to affect the decision to undergo catheterization. This does not totally remove work up bias. Since frequently these subjects are undergoing catheterization because of the result of the testing, the results tabulated in table 1 are taken from studies that regarded to be relatively free of biase. These results accurately reflect the sensitivity and