ORIGINAL ARTICLE

Comparison of Exercise Tolerance Tests and Thallium 201/MIBI Scan in the Diagnosis of Ischemic Heart Disease

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ABSTRACT

Aim: To compare the sensitivity and specificity of ETT alone and stress MIBI scan for the diagnosis of coronary artery disease.

Methods: This descriptive study was comprised 100 patients and carried out in the Postgraduate Medical Institute – Lahore General Hospital; Lahore from October 2011 to August 2012.

Results: Out of 100 patients, 74(74%) were male and 26(26%) were female. Exercise tolerance test positive was showed in 74(74%) patients. Among these patients, 60(81%) were male and 14(19%) were female patients. Among 42 hypertensive, 34(81%) patients showed positive exercise tolerance test. Out of these 34 patients, 28(82%) patients were male and 6 (18%) were female.

Conclusion: It is concluded from the study that radiopharmaceutical scan is better tool for diagnosis of coronary artery disease.

Keywords: Coronary artery disease, Exercise tolerance test, Hypertension

INTRODUCTION

Coronary artery disease is one of the commonest causes of death throughout the world. Despite impressive study in diagnosis and management over the last 3 decades acute myocardial infarction (AMI) continues to be a major public health problem in the industrialized world. In USA about 1.5 million people suffer from coronary artery disease each year[1]. More than 1 million patients with suspected AMI are admitted yearly to coronary care units in the USA[2]. Although 50% of death associated with AMI occur within 1 hour of the even and are attributable to arrhythmias, most often ventricular fibrillation[3].

Coronary artery disease is responsible for majority of deaths as well as morbidity in the USA[4]. With increasing affluence seen in Pakistan the prevalence of coronary artery disease is very rapidly approaching the figures of developed countries[5].

To supervise the disease in appropriate way it is necessary to have safe and economical system of assessment to diagnose the disease. The diagnosis of coronary artery disease (CAD) is made by two of three WHO criteria i.e. typical history of chest pain, typical ECG changes or elevation of serum cardiac enzymes in a characteristic pattern[6].

It has been seen that many of the patients with coronary artery disease have typical symptoms or ECG changes. In such cases it is difficult to diagnose these patients as having CAD. In such situations it is imperative to have some kind of investigations to reach an early diagnosis so as to

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prevent the mortality and morbidity caused by the CAD[7].

There are many false positive and false negative results when this test used alone. So the value of this test to diagnose coronary artery disease is greatly jeopardized. So it is concluded that this test is neither 100% specific nor sensitive. In spite of all these drawbacks this test is being increasingly used for the diagnosis of CAD[8].

The other non-invasive method for the diagnosis of CAD is radionuclide imaging of the heart, which is carried out usually by thallium-201 and technetium-99m. It has a low cost and offers tremendous diagnostic advantages. It is being carried out at various places in Pakistan. Physicians have become aware of its importance. They are using radionuclide exercise testing to obtain functional information more often and consider the test to be considerable value[9]. Several local studies have established its role for the diagnosis of CAD[10].

Radionuclide scientigraphy may demonstrate a fixed perfusion defect compatible with ischemia or infarction. Technetium-99m (^{99m}TC) pyrophosphate scanning have 80-90% sensitivity and specificity in diagnosing acute transmural infarction but it is only 40-80% sensitive for small non-Q wave MI[11].

Kawana was the first who used thallium for scientigraphy[12]. It is cost effective to use exercise thallium imaging for risk stratification[13]. ^{99m}TC sestemibi will be used to carry out the present study.

PATIENTS AND METHODS

This descriptive study was comprised 100 patients and carried out in the Postgraduate Medical Institute, Lahore General Hospital; Lahore from October 2011

to August 2012. A total of 100 patients were randomly selected. They wee referred from outpatient departments of General Medicine and MINAR, Nishtar Hospital, Multan. The patients included in present study were those complaining of central chest pain having suffocating, compressing, bursting or burning character with history of radiation of pain to both arms or left arm or right arm or to the jaw. The important thing in these patients was that they were having normal ECG but with typical pain of angina pectoris on history.

RESULTS

Out of 100 patients, 74(74%) were males and 26(26%) were females. Positive EET was shown in 74(74%) patients. Among these patients, 60(81%) were male and 14(19%) were female. Among 42 hypertensives, 34(80.9%) patients showed positive ETT. Out of these 34 patients, 28(82.4%) patients were male and 6(17.6%) were female (Table 1). Total number of diabetic patients was 34. Out of these 22(64.7%) were male and 12 (35.3%) were females. ETT positive was shown in 18 (82%) diabetic males while only 4 (33%) diabetic female patients showed positive on ETT (Table 2). The number of patients with deranged lipid profile was 14. Out of these, 6(42.9%) were male and 8 (57.1%) were female. All male patients showed positive ETT while 4(28.5%) female patients showed positive ETT (Table 3). Out of 60 smoker patients, 58(96.7%) were male and 2(3.3%) were female. Among 58 male smokers, 54(93.1%) showed positive ETT but both the female smokers showed positive ETT (Table 4).

Table 1: Sex distribution in hypertensive patients having positive ETT (n=34)

Gender	n	%age
Male	28	82.3
Female	6	17.6

Table 2: Diabetic patients showing positive exercise tolerance test (n=34)

Gender	n	%age
Male	22	64.7
Female	12	35.3

Table 3: Positive ETT of patients with deranged lipid profile (n=14)

Gender	No.	%age
Male	06	42.9
Female	08	57.1

Table 4: Smokers with positive ETT (n=60)

Gender	n.	%age
Male	58	96.7
Female	02	3.3

DISCUSSION

Ischemic heart disease is a global health problem. Its magnitude of severity is going on increasing. Like western countries, its incidence is also increasing in Pakistan[14,15,16]. Thus the importance of early diagnosis and precise detection of coronary artery disease cannot be overemphasized.

In the absence of coronary angiography, the exercise tolerance test and radio-pharmaceutical stress scan have emerged as he considerable diagnostic and prognostic values, as is evident from the discussion at various points in my dissertation. However, these tests are neither 100 sensitive nor specific like coronary angiography. It was observed when the simple procedure of ETT was carried out 74 (74%) patients out of 100 patients showed ST segment abnormalities suggestive of ischemia. So the diagnostic yield of ETT was 74%.

After [99m]TC-sestamibi stress perfusion scan 92 (92%) patients out of 100 showed ischemic defects on the picture obtained by gamma camera. So the diagnostic yield of it was 92%. So it is clear from the study that stress scientigraphy is better mode of investigation for diagnosis of CAD than simple ETT. This correlates well with other study.[17] It was observed when the simple procedure of ETT was carried out 74 (74%) patients out of 100 patients showed ST segment abnormalities suggestive of ischemia. So the diagnostic yield of ETT was 74%.

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CONCLUSION

It is concluded from the study that radiopharmaceutical scan is better tool for diagnosis of coronary artery disease.

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