Significance of Holter Monitoring in Evaluation of Non-Specific Symptoms.

Mohammad Nadeem
Armed Forces Bone Marrow Transplant Centre, Combined Military Hospital, Rawalpindi.

Abstract

Background: To determine the diagnostic significance of Holter monitoring in evaluation of non-specific symptoms (like palpitations, dizziness, syncope, etc.).

Methods: In this descriptive study 100 consecutive patients referred for the evaluation of non-specific symptoms were selected for Holter monitoring after initial evaluation. Through Holter monitoring two channels via five leads, placed over the anterior chest wall, were recorded. The disc was attached to a strap, which the patient wore on his shoulder. The recording was usually started in the morning at hospital and the patient was allowed to resume his normal activities. He was advised to maintain his activity log and asked to report back at the same time next day.

Results: Ventricular ectopics less than 10% were present as isolated events in 81%. Supraventricular episodes less than 10% were present as isolated events in 93%. Mean minimum heart rate was 43, mean maximum heart rate was 123 and mean average heart rate was 71. The ST-segment shift was present in 21% of the population in which 3% were ST-segment elevation and 19% were ST-segment depressions.

Conclusion: For the patients with non-specific symptoms Holter monitoring has got an insignificant role, in the primary diagnosis of myocardial ischemia or arrhythmia as a cause of such symptoms.

Key Words: Holter monitoring, Arrhythmias, Ischaemia, Palpitations.

Introduction

Holter monitoring is the 24 hours ambulatory electrocardiographic recording and analysis. It was initially designed to observe the variations in normal cardiac rhythm in everyday activities. In the recent years, its use has been further extended in the diagnosis of cardiac arrhythmias, quantification of arrhythmias, evaluating antiarrhythmic therapy, detecting pacemaker malfunction, heart rate variability studies, and in prognostic stratification of arrhythmias. It has also been used in detecting silent episodes of myocardial ischemia and in evaluating various nonspecific symptoms.
ischemia ST-segment shift defined as 1 mm ST segment shift (either elevation or depression) was studied in one or both of the channels. The heart rate variability and late potential studies were not included in this study.

### Results

The data analysis of the 100 patients studied showed, 31% females and 69% males with a mean age of 43 years (7 to 78 years). Twelve percent had a history of chest pain, 57% had palpitations, 13% had dizziness and 18% had other nonspecific symptoms. The history of ischemic heart disease was present in 21%. The history of hypertension was present in 18%. The history of diabetes mellitus was present in 6%. Three per cent had a history of cigarette smoking and 9% had raised serum lipids. Chest X-ray was normal in majority (97%) of the cases. Resting electrocardiogram was normal in 64% and abnormal in 36% of cases. Most common abnormality being non-specific ST-T changes or isolated insignificant Q waves. Two-dimensional echocardiography was normal in 88% of cases while exercise tolerance test was normal in 95% of cases.

On Holter recording it was found that ventricular ectopics less than 10% were present as an isolated event in 81%. Ventricular ectopics more than 10% were absent in 93% and present as isolated events in 5%, as bigeminy in 1% and as couplets in 1% (Table-1). It was observed that supraventricular episodes less than 10% were absent in 6%, present as isolated events in 93% and occurred as runs in 1%. Supraventricular episodes, more than 10%, as an isolated event, occurred in 1% (Table -2). Sinus pauses were present in 1%. Mean minimum heart rate was 43, mean maximum heart rate was 123 and mean average heart rate 71. The ST-segment shift was present in 21% of the population in which 3% were ST-segment elevation and 19% were ST-segment depressions (Table -3).

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### Discussion

Present study shows that with atypical chest pain the probability of detecting silent ischemia with Holter is very low. It was observed that out of the 13 patients with a positive history of ischaemic heart disease, 8 (61.5%) had ST-segment shift (Table-3). These findings are consistent with various studies of Holter monitoring in patients with ischemic heart disease, which have indicated that the silent myocardial ischemia is the most frequent consequence of coronary artery disease and occurs in almost 70-80% of ischemic episodes. Thus Holter monitoring can detect episodes of silent myocardial ischemia in patients with coronary artery disease. However for nonspecific symptoms with no coronary artery disease the chances of finding out underlying silent ischaemia are low. According to ACC/AHA guidelines, on Holter, there is little evidence that Holter monitoring provides reliable information concerning myocardial ischaemia in asymptomatic subjects without known coronary artery disease.  

ST segment changes and other repolarization abnormalities can occur for reasons other than myocardial ischaemia. These include hypertension, LV hypertrophy, LV dysfunction, postural changes, tachyarrhythmias, preexcitation, sympathetic influences, drugs including digitals and electrolyte abnormalities. In present study it was observed that in hypertensive patients, 22.2% had ST-segment shift depicting silent ischemia. In hypertension, hypotrophy of the left ventricle might enhance the risk of ischemia because of an augmented oxygen demand and an insufficient oxygen supply.

On comparing the incidence of significant arrhythmias (i.e. supraventricular episodes more than 10% and ventricular ectopics more than 10%) against various symptoms, it was found that in patients with chest pain, dizziness or syncope no episode of supraventricular or ventricular ectopic activity more than 10% were recorded. However in the patients presenting with palpitations that formed the major part of the population (n=57), ventricular ectopics more than 10% occurred as isolated episode in 5, as bigeminy in 1 and as couplets in 1 patient. Thus in patients with palpitation 12.2% had significant

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<th>Table -2: Supraventricular Ectopics</th>
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ventricular episodes and none had significant supraventricular episodes showing a p-value of .008 which is statistically significant. On the other hand no significant (more than 10%) supraventricular activity could be recorded in any patient with palpitation while they were present in 6% of patients without palpitation. This gives a very low incidence of arrhythmias in patients screened by Holter monitoring. This implies that palpitations may have noncardiac causes. This also showed that in the patients with palpitations only significant ventricular episodes were recorded which means that ventricular ectopics are more readily experienced by the patients as palpitations perhaps because of the compensatory pause that follows such ectopics. Patients with palpitations remained symptomatic and functionally impaired and had increased rates of panic disorder and frequent number of physician visits following Holter monitoring. The detection of arrhythmia may improve if the duration of Holter monitoring is increased.

In the present study, out of the 13 patients with dizziness or syncope, no evidence of cardiac arrhythmia was found. This was also observed in ACC/AHA guidelines on Holter monitoring that although the diagnostic yield of Holter in syncope and related symptoms is very low but because of the severity of such symptoms, evaluation with Holter is usually warranted. In another study in paediatric population 61% patients with epilepsy when subjected to cardiovascular testing including Holter showed an alternative diagnosis.

Untreated hypertensive patients even with left ventricular hypertrophy had a low prevalence of frequent or complex ventricular arrhythmias. Holter monitoring may have a role to identify asymptomatic older adults at risk of sudden cardiac death due to arrhythmias.

In the present study it was found that the mean average heart rate for the entire population was 71.4. It was more in the patients with negative history of ischemic heart disease (72.3) as compared to those with a history of ischemic heart disease (68.2). It was more in nonsmokers (71.5) than in smokers (68.3). It was found that the mean average heart rate was more in the hypertensive (71.98) than in normotensives (69.2). The mean average heart rate studied during Holter monitoring was found to be more in diabetics (83) than in non diabetics (70.7), which are consistent with the fact that diabetes may cause autonomic neuropathy thus the influence of autonomic activities on the heart rate is lost. The more sensitive index to look for the autonomic dysfunction on Holter monitoring is the study of heart rate variability, not included in present study. A recent study classified the transient ST segment deviation episodes in ambulatory ECG recordings into ishaemic and non ischaemic on the basis of heart rate changes. They also used certain other ECG parameters to classify these episodes.

**Conclusion**

Routine use of Holter monitoring as a first line investigation for evaluating non-specific symptoms needs critical appraisal.

**References**