



An Observational Study of Holter Monitoring in Patients Admitted to a Tertiary Care Hospital in Western Maharashtra

KEYWORDS

Holter monitoring, Abnormal Insignificant, Abnormal Significant, Bradyarrhythmia, Tachyarrhythmia, ECG.

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ABSTRACT **INTRODUCTION:** Holter ECG monitoring is a non invasive tool for evaluation of syncope, palpitations, various conduction and rhythm disturbances associated with systemic diseases. The aim of the study was to observe the pattern of rhythm abnormalities, frequency of their occurrence, their demographic profile and use it as a guide to subsequent therapy wherever necessary. Availability of holter monitoring facility at our charitable general hospital enabled us to design this observational study.

MATERIALS AND METHODS: 24 hour Holter monitoring data for patients with syncope, giddiness, palpitations admitted in Smt. Kashibai Navale Medical college and General Hospital, Pune, Maharashtra, a teaching tertiary care hospital in western India from July 2014 to February 2015 was collected and analyzed with respect to age, gender, cardiac rhythm abnormalities detected whether significant or insignificant clinically and any other non rhythm abnormalities if noticed during the study.

RESULTS: Holter monitoring data for 106 patients was analyzed. 74(69.8%) patients were male, 32 (30.19%) patients were females. 36 (34%) patients were ≤ 41 years, 70(66%) were >41 years of age. Abnormal Significant rhythms were seen in 22(20.75%). Abnormal Insignificant diagnoses were detected in 45 (42.45%) patients. A normal holter study was seen in 39(36.8%) patients.

CONCLUSION: Holter monitoring is a non invasive tool in evaluation of syncope and palpitations and may help in guiding therapy. Utility of holter monitoring for more than 24 hrs may have a limited role in symptomatic patients without significant rhythm disturbance for 24 hrs.

INTRODUCTION

Holter monitoring was first introduced by an American biophysicist Norman J. Holter in 1940s

It is a non invasive tool for evaluation of syncope, palpitations, various conduction and rhythm disturbances associated with systemic diseases. Yet it is not commonly available to a non affording community in India. The overall diagnostic yield reported in literature is 1 - 20 %.^{1,2} However it strongly depends on the population studied,³ a fact frequently not taken into account when referring patients for holter monitoring. The aim of the study was to observe the pattern of rhythm abnormalities, frequency of their occurrence, their demographic profile and use it as a guide to subsequent therapy wherever necessary. Availability of holter monitoring facility at our charitable general hospital enabled us to design this observational study.

MATERIALS AND METHODS

24 hour Holter monitoring data for patients with syncope, giddiness, palpitations admitted in Smt. Kashibai Navale Medical college and General Hospital, Pune, Maharashtra, a teaching tertiary care hospital in western India from July 2014 to February 2015 was collected and analyzed with respect to age, gender, cardiac rhythm abnormalities detected whether significant or insignificant clinically and any other non rhythm abnormalities if noticed during the study.

The rhythms observed were categorized as follows:

1. ABNORMAL SIGNIFICANT which included

- a. Atrial tachycardia
 - b. Supraventricular tachycardia (SVT)
 - c. Atrial fibrillation- new onset
 - d. Ventricular Premature complexes (VPCs) more than 10% of total QRS complexes
 - e. Ventricular tachycardia
 - f. Sinus bradycardia with heart rate less than 40 beats per minute
 - g. Atrioventricular conduction block- II and III degree
2. ABNORMAL INSIGNIFICANT which included all other rhythm disturbances not categorized as either ABNORMAL SIGNIFICANT or NORMAL. This category also included a patient with T wave abnormality and a patient with proven structural heart disease and persistent palpitations without corresponding rhythm disturbance.
3. NORMAL which included Normal Sinus rhythm

RESULTS

Holter monitoring data for 106 patients was analyzed.

74(69.8%) patients were male, 32 (30.19%) patients were females.

36 (34%) patients were ≤ 41 years, 70(66%) were >41 years of age.

Abnormal Significant rhythms were seen in 22(20.75%). 5 were bradyarrhythmias, 17 were tachyarrhythmias. Out of 17 tachyarrhythmias 5 rhythm abnormalities originated from a supraventricular focus (1 new onset atrial fibrillation and 4 atrial tachycardias), 12 rhythm abnormalities were ventricular in origin (4 had ill sustained ventricular tachycardias, in others more than 10% QRS complexes were unifocal or multifocal VPCs). Out of 5 bradyarrhythmias 3 patients had sinus bradycardia (rate < 40) and 2 patients had atrioventricular blocks.

In patients with significant rhythm abnormalities, 4 were ≤ 41 yrs of age, 18 were > 41 yrs of age (Figure 3). 13 were males and 9 were females. (Figure 2)

Abnormal Insignificant diagnoses were detected in 45 (42.45%) patients. 3 showed bradyarrhythmias , 40 showed tachyarrhythmias, 1 patient had a persistent T wave change which was not detected on routine 12 lead ECG and 1 patient logged in multiple symptomatic episode which did not show any rhythm or any other abnormality (this patient had MVP and perceived palpitations during the event). Out of 40 tachyarrhythmias 2 had sinus tachycardia, 6 atrial fibrillation, 11 had SVTs and 20 had VPCs (< 10% of total QRS complexes). A normal holter study was seen in 39 patients. 22 were ≤ 41 yrs of age, 17 were > 41 yrs of age, 28 were males and 11 were females.

TABLE 1: CATEGORISATION OF RHYTHM ABNORMALITIES

DIAGNOSTIC CATEGORY	DIAGNOSIS	TOTAL NUMBER
ABNORMAL SIGNIFICANT BRADYARRHYTHMIA	Sinus bradycardia (HR<40)	1
	Sinus bradycardia (HR<40) with sinus pause	1
	AV Block- Second Degree-Mobitz II	2
	Complete AV Block	1
TACHYARRHYTHMIA	Atrial Tachycardia	3
	New Onset Atrial Fibrillation	1
	Supraventricular Tachycardia	1
	Ventricular Tachycardia- Ill sustained	4
	VPCs (>10% of total QRS)	8
ABNORMAL INSIGNIFICANT BRADYARRHYTHMIA	Sinus bradycardia (HR >40;<60)	1
	AV block-Second degree-Known	1
	AF with slow VR known	1
TACHYARRHYTHMIA	Sinus tachycardia	2
	A. fibrillation/flutter known	6
	Ectopic atrial rhythm over 24 hrs	1

	APCs including bigeminy and trigeminy	11
	VPCs (<10 % of total QRS)	20
T WAVE ABNORMALITY	New onset T inversion	1
MISCELLANEOUS	Known MVP with palpitations	1

DISCUSSION

Holter monitoring is a non invasive investigation in the evaluation of syncope, palpitations and various rhythm disturbances associated with systemic illness viz. COPD, dilated cardiomyopathy, myocardial infarction, thyroid abnormalities, congenital heart disease etc. In the present study the data of 8 months (July 2014 to February 2015 – Figure 1) was analyzed to classify the diagnostic rhythm abnormalities into Normal, Significant abnormal and Insignificant abnormal as mentioned above. The diagnostic yield of Holter analysis in various studies is 1-20%.^{1,2} It depends on the population under study³ (patient selection criteria used) and duration of the study. Longer duration has higher diagnostic yield.⁴ In the present study, the holter monitoring was done for patients who had syncope(27 patients), palpitations (36 patients), known systemic illness with an expected conduction or rhythm abnormality (31 patients) and asymptomatic patients with 12 lead ECG showing abnormality (12 patients).

Tachyarrhythmias occurred more commonly than bradyarrhythmias in both the categories. Younger patients (≤ 41 yrs) had lesser number of Abnormal Significant diagnoses (4 of 16 i.e. 25%) compared to older patients (> 41 yrs) who had them (18 of 51 i.e. 35.2%).

In two patients, Holter monitoring was extended for 48 hrs. One of these patients showed rhythm disturbance in the latter half of the study underlining the limited role of Holter monitoring for prolonged periods.⁵

In one patient of known atrial fibrillation with intermittent slow VR (< 40 bpm), the holter helped in guiding pharmacotherapy. One schizophrenic patient on antipsychotics had ill sustained VT that led to necessary change in his medications.

Patients with ischaemic dilated cardiomyopathy and post myocardial infarction showed multi-unifocal VPCs. One patient had significant sinus bradycardia during convalescence phase of Dengue fever.

A patient of Kern's Sayre syndrome was shown to have underlying bifascicular block and was advised prophylactic ICD implantation.⁶

CONCLUSIONS

1. Holter monitoring is a non invasive tool in evaluation of syncope and palpitations and may help in guiding therapy.
2. Utility of holter monitoring for more than 24 hour may have a limited role in symptomatic patients without significant abnormality during 24 hour recording.
3. Tachyarrhythmias were much more common than bradyarrhythmias. VPCs as single, bigeminy, trigeminy and couplets were the most commonly observed tachyarrhythmias.

FIGURE 1: MONTHWISE HOLTER MONITORING

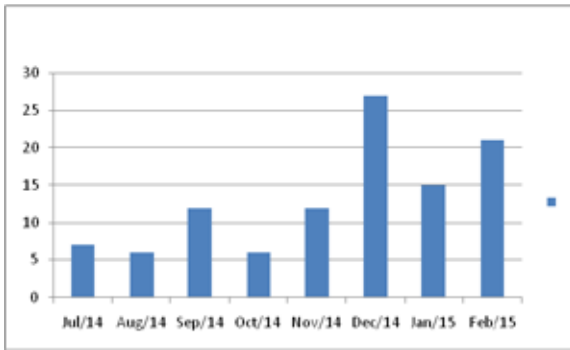


FIGURE 2: GENDER DISTRIBUTION (106 PATIENTS)

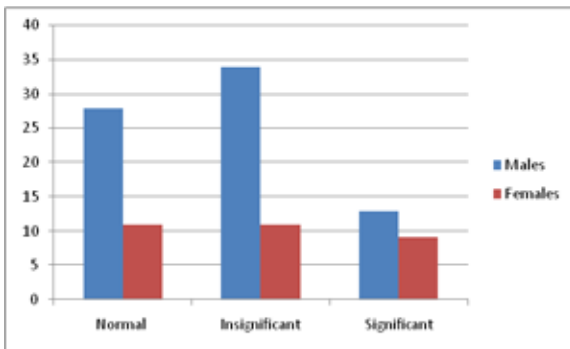
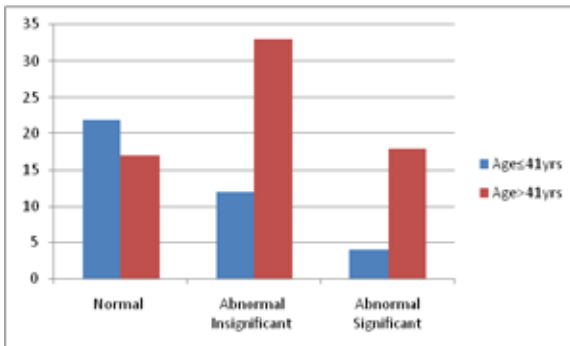


FIGURE 3: AGE DISTRIBUTION (106 PATIENTS)



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