

Original paper

Electrocardiography (Holter) study of patients with panic attacks

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Abstract

B **Background:** many patients complaining of palpitations seem to have normal electrocardiography (ECG).

Aim: to study the 24-hours electrocardiography of patients with panic attacks.

Material and Methods: fifty patients with panic attacks were studied by Holter monitoring for 24 hours each.

Results: Holter monitoring showed ectopic beats in all 50 patients. No other arrhythmia was recorded.

Smoking was significantly associated with having more ectopic beats per day.

Discussion: panic attacks are not well understood. Some link it to autonomic instability. Some studies had found that some people diagnosed with panic disorder are having paroxysmal supraventricular tachycardia (PSVT). No one of the 50 patients we studied had PSVT. On the other hand, all of the 50 patients had several ectopic beats per day.

Conclusion: it seems that ectopic beats are very common among patients with panic attacks.

Keywords: panic, Holter, ectopic

Introduction

Many patients are presented with complaints that occur suddenly to them while they are away from the doctor. One of the frequent presentations to physicians is the sudden onset of palpitation and/or chest pain that lasts for few minutes. The physical examination and investigations are sometimes normal for such patients, a thing that may lead to the conclusion that those complaints are of psychological etiology.

There is a common mistake in labeling those patients with the label of "Hysteria" or its commonly used abbreviation "HYS." The closest better term to describe those complaints scientifically is "panic attacks". Panic attacks occur in almost 2 % of the population, reduce quality of life and may elevate the risk of anxiety disorders and other psychiatric disease patterns ¹. Therefore, panic attacks are an important cause of morbidity and increased

utilisation of medical care. Approximately half of all visits to primary health care providers are precipitated by symptoms that also frequently occur during a panic attack such as nonspecific chest pain, palpitation, dyspnoea, dizziness, or abdominal discomfort but may well be due to somatic diseases. Therefore, patients frequently undergo comprehensive and expensive diagnostic procedures to rule out relevant somatic diseases ².

Physical symptoms play a role in the diagnosis of all anxiety disorders ³ but the studies are still not conclusive about what exactly happens in panic disorder. Intense physiological symptoms are reported during panic attacks by patients. The respiratory system ⁴⁻⁷ as well as the sympathetic and parasympathetic branches of the autonomic nervous system ⁸ seems dysregulated in PD patients.

When palpitation is associated with anxiety or panic attack, it is frequently difficult for the patient to discern whether

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the feeling of anxiety or panic preceded or resulted from the palpitations. In one study, panic disorder was diagnosed as the cause of palpitations in 20% of patients⁹. It seems that many patients who frequently report palpitations have a history of panic attacks^{10,11}.

If an ECG is taken exactly during panic attack, the diagnosis of certain abnormalities is simple. Conversely, ECG may be completely normal or nearly normal in PD patients without attack. Therefore, a correlation of symptoms with 24-hours-Holter monitoring is crucial for a precise diagnosis¹².

Aim of Study

Although there is good evidence that psychiatric disorders are a common cause of palpitations, this diagnosis should not be accepted until true arrhythmic causes have been excluded^{13,14} and the aim of this study is to determine the pattern of arrhythmia

in patients with panic disorder using 24 hour (ambulatory) Holter monitor.

Patients and Methods

In this study, consecutive patients (n=50) with panic attacks were recruited from inpatient ward and out patient internal medicine clinic in AL-Hussein medical city and Al-sadder medical city and studied by 24-hours ambulatory (Holter) monitoring during the period from February 2013 to February 2014.

These 50 patients were regarded as free from medical or cardiovascular illness after history, physical examination, and ECG at the clinic were all negative, hence we use the term "panic attack" to describe what they had suffered from.

Ambulatory (Holter) monitoring

Continuous ECG recording was performed using the commercially available health carewell TLC 5000 device (Figure 1).

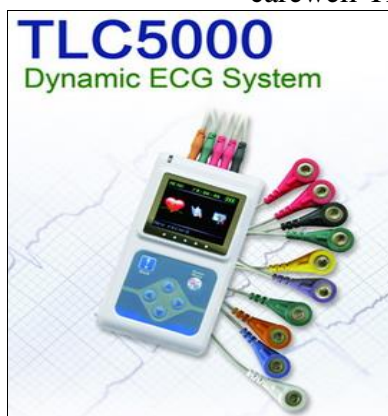


Figure 1.1 Contec ambulatory Blood Pressure Monitor Device.

On Holter monitoring, the evidences for dysrhythmia were ventricular ectopics and escapes (isolated, bigeminy, trigeminy, couplets, triplets, and runs) and supraventricular episodes which included atrial premature contractions and escapes and nodal escape and premature beats (isolated, pairs, and runs). The sinus pauses and the heart rate (minimum, maximum and average) were also recorded. The isolated ventricular ectopics which were less than 10% and the isolated supraventricular episodes which were less than 10% were regarded as insignificant arrhythmias. Clinically, the significant

cardiac arrhythmias are defined as a symptomatic, sustained, supraventricular tachycardia (SVT, supraventricular rate, >150 beats/min), an atrial fibrillation (AF) or a flutter, a sustained ventricular tachycardia (VT, ventricular rate, >120 beats/min), a sinus pause which is longer than 3 seconds, a non-Wenckebach, second-degree heart block, or a third-degree heart block.

For ischemia, the ST- segment shift which is defined as a 1 mm ST segment shift (either an elevation or a depression), was studied in one or both of the channels.

The Holter data collection included the baseline rhythm, documentation of the symptoms during recording, the average heart rate, the minimum heart rate, the maximum heart rate, ventricular ectopy, supraventricular ectopy, and the Holter diagnosis. The Holter diagnoses were defined by the ACC/AHA guidelines as: the documented symptoms with a recorded arrhythmia, which were capable of causing the symptoms, the documented symptoms without the presence of arrhythmia, no documented symptoms with a recorded arrhythmia and no documented symptoms or arrhythmia.

Other Variables

Blood pressure was checked for all individuals included in the study. ECG was performed as a baseline for all patients to detect resting heart rate, dysrhythmia, ST segment shift, and any other abnormalities.

Statistical Analysis

All the data were analyzed by using SPSS, version 16 (SPSS Incorporation). The results of the above mentioned variables were compared by using the Chi square analysis. The significant probability was regarded as below 0.5.

Results

Of the socio-demographic characteristics we studied age and gender of patients. We also asked about smoking. This had shown that the mean age (\pm SD) of the studied patients is 24 (\pm 4.57) years with a range of age between 18–33 years. Among the patients studied there are 23 (46%) female and 27 male (54%) as shown in Figure 1; 34 (68%) are nonsmoker and 16 (32%) are smoker.

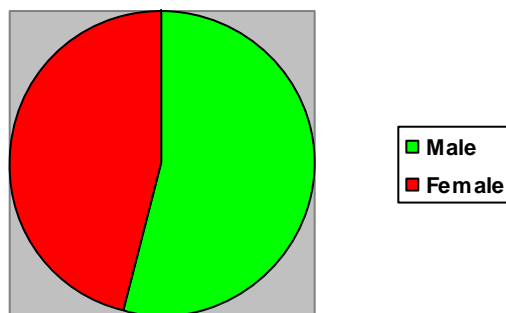


Figure 1 Distribution of patients according to gender.

All patients included in the study proved to have normal ECG sequence. On the other side all of them had ectopics. The mean heart rate was 116 beat per minute (bpm) with 1 standard deviation (SD) of 14. The maximum heart rate reached was 140 bpm in 2 patients only. There was no case of paroxysmal supraventricular tachycardia (PSVT). Systolic and diastolic blood pressure was slightly higher in male with no significant correlation; minimal and maximal heart rate was also higher in male with no significant association; ventricular and supraventricular ectopic beats were

also higher in male with no significant association (Table 1).

Smoking was correlated significantly with patient's age, and the number of ventricular ectopic beats per day. Systolic and diastolic blood pressure was slightly higher in smokers with no significant correlation; minimal and maximal heart rate was also higher in smoker with no significant association; supraventricular ectopic beats were also higher in smoker with no significant association (Table 2).

In our study and after measuring of blood pressure, Holter monitoring had shown

variable heart rate and variable ectopic beats. This is shown in Table 3.

Studying of the correlation between the measured blood pressure and the recorded heart rate had shown no significant association between the minimal heart rate recorded during Holter monitoring and the systolic blood pressure or diastolic blood pressure (Table 4). On the other hand, there was no significant association

between the maximal heart rate and the blood pressure (Table 5).

There was no significant association between the minimal heart rates recorded during Holter monitoring and the supraventricular ectopic beats of the studied patients while there was a statistically significant association between the minimal heart rates and ventricular ectopic beats (Table 6).

Table 1 The association between gender and the main study variables.

		N	Mean	SD	p-value
Age	M	27	25.66	4.26	0.17
	F	23	23.91	4.83	
SBP	M	27	137.96	8.64	.360
	F	23	135.17	12.66	
DBP	M	27	83.62	8.05	.130
	F	23	79.73	9.83	
Minimal rate	M	27	97.7	10.90	.900
	F	23	98	11.76	
Maximal rate	M	27	115	14.22	.650
	F	23	117	14.38	
SVEB	M	27	33.40	4.69	.570
	F	23	32	11.02	
VEB	M	27	61.85	96.08	0.22
	F	23	35.60	33.90	

Table 2 The association between smoking status and the main study variables

	Smoking	N	Mean	SD	P- value
Age	S	16	26.81	3.79	0.03
	N	34	23.94	4.67	
SBP	S	16	139.75	9.11	0.1
	N	34	135.24	11.14	
DBP	S	16	82.25	8.02	0.8
	N	34	81.64	9.58	
Minimal rate	S	16	97.93	12.16	0.9
	N	34	97.85	10.89	
Maximal rate	S	16	115.62	15.09	0.8
	N	34	116.32	13.96	
SVEB	S	16	34.25	6.31	0.3
	N	34	32.11	8.90	
VEB	S	16	80	121.21	0.04
	N	34	35.55	31.12	

Table 3. The mean, minimum and maximum SBP and DBP, minimal and maximal heart rate, supraventricular ectopic and ventricular ectopic.

Variable	minimum number	Maximum number	Mean
Minimal rate	76	121	97.8800
Maximal rate	90	140	116.1000
SBP	110	162	136.68
DBP	66	96	81.8400
SVEB	4	44	32.8000
VEB	2	417	49.7800

Table 4. The strength of association between minimal heart rate and the blood pressure

Mean values	P - value
SBP against minimal heart rates	0.333
DBP against minimal heart rates	0.069

Table 5. The strength of association between maximal heart rate and the blood pressure

Mean values	P - value
SBP against maximal heart rates	0.93
DBP against maximal heart rates	0.99

Table 6. The strength of association between minimal heart rate and supraventricular as well as ventricular ectopic beats

Mean values	P - value
SVEB against minimal heart rates	0.236
VEB against minimal heart rates	0.023

SVEB: supraventricular ectopic beats
VEB: ventricular ectopic beats

There was no significant association between the maximal heart rate recorded via Holter monitoring with supraventricular ectopic beats or with ventricular ectopic beats (Table 7).

Table 7. The strength of association between Holter monitoring and supraventricular as well as ventricular ectopic beats

Mean values	P - value
SVEB against maximal heart rates	0.91
VEB against maximal heart rates	0.79

SVEB: supraventricular ectopic beats
VEB: ventricular ectopic beats

Discussion

Panic attacks and palpitation frequently present similar clinical symptoms. Especially in cases without unambiguous ECG or Holter documentation, it can be difficult to discriminate between these entities.

In our study, the range of age was between 18–33 years with a slight increased in male gender of the studied patients. Without case selection, this was inconsistent with Lessmeier et al.¹⁵ who studied the potential for misdiagnosis as panic disorder and noticed that women were more likely than men to have symptoms

ascribed to psychiatric origins (65 % vs. 32 %, respectively; $P < 0.04$).

The minimal and maximal heart rate was higher in the studied male patients with no significant association. This was partly consistent with Walters et al.¹⁶ who studied the panic disorder and risk of new onset coronary heart disease and found that women had higher maximal heart rate and men had minimal heart rate. The minimal and maximal heart rate was higher in smokers and the statistical analysis shows no significant association.

Ventricular and supraventricular episodes were higher in male (smokers and non-smokers) with no significant association. This was inconsistent with McCrank et al.¹⁷ who studied the correlation between paroxysmal supraventricular tachycardia and panic disorder and found that paroxysmal supraventricular tachycardia is more prevalent in women.

Few studies of 24 hours Holter for patients with panic attacks found that some cases have PSVT¹⁸.

Other studies found that ECG configuration is maintained in patients with panic attacks and this had been explained that in panic attacks there is no abnormality in heart conduction, but there is alteration in autonomic function, mainly increased sympathetic activity during the panic attack¹⁹.

There were earlier hypothesis of linking patients with anxiety with chronic autonomic hyper-arousal or with excessive autonomic liability^{20, 21}.

Studying of the correlation between the measured blood pressure and the recorded heart rate had shown no significant association between the minimal heart rate recorded during Holter monitoring and the systolic blood pressure (p-value of 0.333) or diastolic blood pressure (p-value of 0.069).

On the other hand, there was no significant association between the maximal heart rate and the systolic blood pressure (p-value of 0.93) nor between maximal heart rate and diastolic blood pressure (p-value of 0.99).

There was no significant association between the minimal heart rates recorded during Holter monitoring and the supraventricular ectopic beats of the studied patients (p-value of 0.236) while there was a statistically significant association between the minimal heart rates and ventricular ectopic beats (p-value 0.023).

There was no significant association between the maximal heart rate recorded via Holter monitoring with supraventricular ectopic beats (p-value of 0.91) or with ventricular ectopic beats (p-value of 0.79).

Panic attacks are a source of suffering to patients and it is unacceptable that we told them that "nothing is wrong with them", or that "it is all in your mind". Some studies have even found some relation between panic attacks and acute coronary syndrome²². But we won't concentrate on these studies since they are beyond the aim of our study.

In our study all patients had ectopics, mostly ventricular. Different studies show that even frequent and complex ventricular ectopics (>60/h or 1/min) occur in apparently healthy subjects with an estimated prevalence of 1-4% of the general population²³.

Ectopic beats has no clinical significance to normal hearts, yet, as our study shows, its prevalence in patients with palpitation may be high.

Limitations of our study include the sample size of our sample, and the absence of biochemical and hematological investigations as variables to study. Other studies on palpitation have given attention to caffeine as a cause of palpitation and ectopics, yet in our study we didn't include this variable. Another limitation is that we didn't ask about agoraphobia which is usually associated with recurrent panic attacks.

Conclusion

Panic attacks is not associated with significant dysrhythmia but is strongly associated with ectopics. Ectopic beats occur significantly more in patients who smoke.

Recommendations

1. Similar studies needed to be done with larger sample size and including larger variables.
2. Use of Holter ECG is helpful for patients with episodic complaints like those of panic attacks.
3. Multidisciplinary team including a psychiatrist and a physician is better for caring for those patients with complaints resembling arrhythmia and panic attacks.

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