

Original article

Assessment of energy expenditure, physical activity and sleep pattern in patients with frequent symptomatic ventricular ectopic beats[☆]

Évaluation de la dépense énergétique, de l'activité physique et du rythme de sommeil des patients souffrant d'extrasystoles ventriculaires symptomatiques

Filiz Kızılırmak Yılmaz^{a,*}, Aysel Yıldız^b, Gultekin Gunhan Demir^a, Tayyar Gokdeniz^a,
Haci Murat Gunes^a, Mehmet Onur Omaygenç^a, Beytullah Cakal^a, Fatma Mutluay^c,
Bilal Boztosun^a

^a Medipol University Faculty of Medicine, Cardiology Department, Istanbul, Turkey

^b Marmara University Faculty of Medicine, Physical Therapy and Rehabilitation Department, Istanbul, Turkey

^c Medipol University Faculty of Medicine, Physical Therapy and Rehabilitation Department, Istanbul, Turkey

Received 25 January 2016; received in revised form 3 February 2016; accepted 29 February 2016

Available online 1 April 2016

Abstract

Background. – Ventricular ectopic beats (VEBs) are considered as benign ventricular arrhythmias in patients without structural heart disease. However, symptomatic frequent VEBs can adversely affect energy metabolism. The present study aimed to determine the effect of symptomatic frequent VEBs on energy expenditure, physical activity and sleep pattern.

Methods. – Thirty-seven patients with symptomatic frequent VEBs and no structural heart diseases were enrolled. Patients underwent simultaneous 24-hour-ambulatory Holter electrocardiogram monitoring and the BodyMedia armband device monitoring which measures energy expenditure. Data acquired from both devices were compared with the data acquired from healthy volunteers in the control group.

Results. – Total energy expenditure (TEE) was higher in the patient group than the control group (1470 ± 353 kcal vs 1125 ± 275 kcal, $P < 0.001$). Average metabolic equivalence (aMETs) (1.1 ± 0.2 vs. 1.3 ± 0.2 , $P = 0.028$), physical activity duration (PAD) (0.35 vs. 0.48 , $P = 0.007$) and sleep duration (SDN) (3.15 vs. 4.31 , $P = 0.004$) were significantly lower in the patient group than control group. VEBs frequency was inversely correlated with only SDN ($r = -0.374$, $P = 0.027$).

Conclusion. – Total energy expenditure (TEE) is increased in patients with symptomatic frequent VEBs in comparison with healthy subjects while PAD, average metabolic equivalence (aMETs) and SDN are decreased. VEBs frequency was inversely correlated with SDN.

© 2016 Association pour le développement de la recherche en nutrition (ADREN). Published by Elsevier Masson SAS. All rights reserved.

Keywords: Ventricular ectopic beats; Energy expenditure; Physical activity

Résumé

Les extrasystoles ventriculaires symptomatiques (EVS) sont considérées comme des arythmies ventriculaires bénignes dans le cas des patients sans trouble cardiaque structurel. Toutefois, les ESV symptomatiques fréquentes peuvent dégrader le métabolisme énergétique. L'étude présente a pour objet de déterminer quel est le lien entre les ESV symptomatiques fréquentes, la dépense énergétique, l'activité physique et le rythme de sommeil.

Méthodes. – Trente-sept patients avec ESV symptomatiques fréquentes et sans trouble cardiaque structurel ont été sélectionnés. Ils ont été placés pendant 24 h sous surveillance simultanée par électrocardiogramme Holter ambulatoire et brassard BodyMedia qui mesure la dépense énergétique. Les données obtenues par les deux instruments ont été comparées avec celles de volontaires sains d'un groupe témoin.

[☆] The study was conducted in the Cardiology Department of Medipol University Hospital.

* Corresponding author. Medipol University Hospital, Cardiology Department, TEM Avrupa Otoyolu Göztepe, Çıkışı No: 1 Bağcılar, 34214 İstanbul, Turkey.

E-mail address: filizkizilirmak@hotmail.com (F.K. Yılmaz).

Résultats. – La dépense énergétique totale (DET) était plus élevée pour le groupe des patients, comparée à celle du groupe témoin (1470 ± 353 kcal/j versus 1125 ± 275 kcal/j, $p < 0,001$). Le niveau de dépense en équivalents métaboliques (aMETs) ($1,1 \pm 0,2$ vs. $1,3 \pm 0,2$, $p = 0,028$), la durée d'activité physique (DAP) ($0,35$ versus $0,48$ h/j, $p = 0,007$) et la durée de sommeil (DS) ($3,15$ versus $4,31$ h/j, $p = 0,004$) étaient significativement réduits dans le groupe des patient, par rapport au groupe témoin. La fréquence des ESV était inversement corrélée seulement avec la DS ($r = -0,374$, $p = 0,027$).

Conclusion. – La DET augmente chez les patients qui ont des ESV symptomatiques fréquentes, par rapport aux sujets sains, tandis que le aMETs, la DAP et la DS sont réduits. La fréquence des ESV est inversement corrélée à la DS.

© 2016 Association pour le développement de la recherche en nutrition (ADREN). Publié par Elsevier Masson SAS. Tous droits réservés.

Mots clés : Extrasystoles ventriculaires ; Dépense énergétique ; Activité physique

1. Introduction

Ventricular ectopic beats (VEBs) are considered as benign ventricular arrhythmias in patients with no structural heart diseases. However, symptoms including such as palpitations, fatigue and dizziness are not uncommon in these patients. Frequency of VEBs and severity of symptoms play decisive roles in the treatment [1]. VEBs were shown to be associated with decreased exercise tolerance [2]. Besides, symptomatic VEBs may be linked to worsened quality of life.

The SenseWear Pro Armband is a portable device that can measure energy expenditure, physical activity and sleep duration (SDN) [3,4]. To our knowledge, alterations in energy expenditure in patients with symptomatic frequent VEBs have not been investigated before. In the present study, we aimed to assess the impact of symptomatic frequent VEBs on energy expenditure, physical activity and SDN.

2. Methods

The study group consisted of 50 patients with no structural heart disease who were referred to our outpatient clinic for symptoms of palpitation and sensation of abnormal pulsation (rapid, slow or irregular heartbeat) episodes at least 3 times in the last week. Patients were monitored with both 24-hour-ambulatory Holter electrocardiogram (ECG) and the BodyMedia armband device measuring energy expenditure simultaneously. Both devices collected and stored patient data for 24 hours. Thirty-seven patients with frequent VEBs documented by 24-hour-ambulatory Holter-ECG monitoring were recruited. The rest of the patients were excluded. Frequent VEBs were defined as the presence of more than 10 VEBs per hour [5]. Structural heart disease (myocarditis, coronary artery disease, valvular disease other than mild forms, heart failure, cardiomyopathy, arrhythmogenic right ventricular dysplasia, systemic disease (hypertension, diabetes mellitus, endocrine diseases such as hyperthyroidism and metabolic disorders), neoplastic diseases, anemia, neurological or psychiatric diseases, chronic pulmonary diseases, ion channelopathies (long-QT syndrome, Brugada syndrome, catecholaminergic ventricular tachycardia etc.), sustained and non-sustained ventricular tachycardia, supraventricular tachycardia or medical therapy with any drug were determined as exclusion criteria. ECG, transthoracic echocardiography and biochemical blood analyses were

performed in all patients and exercise stress test was performed in patients with suspected coronary artery disease. Patients with abnormal exercise stress test were excluded. The control group consisted of healthy volunteers and their data obtained by both 24-hour-ambulatory Holter monitoring and the BodyMedia armband device were compared with the patient group. Participants in both groups were warned about not limiting and resuming their daily physical activities during the recording period.

2.1. Measurements

The SenseWear Pro 3 Armband (BodyMedia, Pittsburgh, USA) is multi-sensor device containing a three-axis accelerometer that tracks the movement of the upper arm and body and provides information about body position. The commercially available, lightweight sensor system was worn the left upper arm over the triceps muscle. A synthetic heat-flux sensor measures the amount of heat being dissipated by the body to the immediate environment. Skin temperature and armband-cover temperature are measured by sensitive thermistors. The armband also measures galvanic skin response (GSR), the conductivity of the wearer's skin, which varies due to sweating and emotional stimuli.

The recorded data is integrated, processed and analyzed by a software device (InnerViews ResearchSoftware, Professional Version 6.1, USA) which uses proprietary algorithms taking account of the individual's demographics (like age, height, weight, and sex), and validly calculates daily total energy expenditure (TEE), active energy expenditure (AEE), physical activity duration (PAD), SDN, average metabolic equivalence (aMETs) [3,4,6,7].

2.2. Statistical analysis

SPSS 23.0 statistical software (SPSS Inc., Chicago, IL, USA) were used for statistical analysis. Continuous variables were expressed as mean \pm standard deviation (SD) or median and interquartile range as appropriate. Categorical variables were expressed as percentages. The Kolmogorov Smirnov test was used to test normality of distribution of continuous variables. Group means for continuous variables were compared with the use of Student's *t*-test or the Mann-Whitney U test, as appropriate. Pearson or Spearman correlation analysis was used for assessing correlation between total VEBs frequency and

Download English Version:

<https://daneshyari.com/en/article/2691759>

Download Persian Version:

<https://daneshyari.com/article/2691759>

[Daneshyari.com](https://daneshyari.com)