Comparison of variables of heart rate variability in distinguishing between severities of depression

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ABSTRACT

The amount of middle-age women with depression keep increasing because of the psychological and physiological effects in menopause. Previous researches did not examine the relevance of the heart rate variability (HRV) to depression when investigating the psychological reactions of that in middle-age women. The aim of our study was to compare the low frequency (LF), high frequency (HF) and LF / HF ratio of HRV between middle-age women with mild and severe depression, and the severity was defined by the assessment of Taiwanese depression questionnaire (TDQ). 28 women with mild depression (TDQ score: 11.62 ± 1.81) and 20 women with severe depression (TDQ score: 24.71 ± 1.57) were recruited for electrocardiographic signals. The frequency-domain method was used to analyze the electrocardiographic signals calculating HF, LF and LF / HF ratio. The analysis of receiver operating characteristic curve showed that LF values were the easiest to be discriminated of mild and severe depression in middle-age women. The area under the receiver operating characteristic curve of LF (0.72, 95%CI 0.57－0.84) was significantly ($p < 0.05$) more than that of HF (0.61, 95%CI 0.45－0.74), but there was no significant difference between LF and LF / HF ratio (0.77, 95%CI 0.62－0.88). This finding is consistent with the suggestion that LF is more sensitive than HF to reveal the severity of depression of middle-age women.

Categories and Subject Descriptors

The aim of our paper is to analysis the electrocardiograph assessment for middle-age with depression, and the correct category is "Measurement."

Keywords

Depression, heart rate variability, frequency-domain method

1. INTRODUCTION

The amount of middle-age women with depression keep increasing because of the psychological and physiological effects in menopause [1]. The World Health Organization defines the period of time without menstruation for 12 consecutive months is known as menopause [2]. Past studies found that cardiovascular symptoms, depression and anxiety are significant increases in menopause [3, 4]. Besides, some studies also pointed out those women with menopausal symptoms are easily lead to the deterioration of the quality of life [4, 5]. The female hormone imbalance, aging, and social and psychological factors often cause these symptoms of menopause, and lead middle-age women to higher risk of depression.

Heart rate variability (HRV) is a well known indicator to predict cardiovascular disease. It can also show the adjustment function of the autonomic nervous system. Variables of HRV can respond the sympathetic or parasympathetic tone and the balance of both are important indicators. So we hypothesize that HRV can show the adjustment of autonomic nervous system to reflect depression, anxiety and pressure situation of middle-age women. But previous scholars did not examine the relevance of the heart rate variability (HRV) to depression, when investigating psychological reactions in middle-age women [6, 7]. The aim of our study was to compare the variables of HRV including low frequency (LF), high frequency (HF) and LF / HF ratio of middle-age women with mild and severe depression.

2. METHODS

This is a cross-sectional study, and subjects were community-recruited middle-age women. The study procedure is approved by the Medical Ethics Committee of a teaching hospital, and all subjects signed a consent form. The inclusion criterion was women with menopause for consecutive 12 months. The exclusion criteria were subjects had hormone replacement therapy, heart disease or surgery, a history of smoking, and taking any medication, caffeine or alcohol within the previous 24 hours of the examination.

All subjects were assessed by a questionnaire, Taiwanese depression questionnaire (TDQ), as shown in Table I. It contains 18 items, and uses a numerical ranking that indicates the frequency of depression (0 = no or little, or once a week; 1 = sometimes, or one to two days a week; 2 = often, or three to four days a week; 3 = always, or 5 to 7 days a week). The total score is