

血圧改善のため概日リズムを用いた 運動療法の効果に関する研究

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Circadian Rhythm Based Walking Therapy for the Prevention of Hypertension

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ABSTRACT

It has been reported that 9,070,000 individuals had hypertension and 400,000,000 individuals had prehypertension in Japan, 2011. In view of the huge population of prehypertension and its high possibility to develop hypertension without a proper treatment, effective measures to control the blood pressure (BP) of this population is indispensable. For this population, aerobic exercise, such as walking, is generally recommended. However, it has been reported that exercise taken at different timing of a natural day have different endocrinal response, which may also influence the BP. Further, among the types of aerobic exercise, walking is considered as an appropriate one for its flexibility and efficacy in lowering BP. Therefore, in this study, we focus on the influence of the timing of walking to the BP control for the prehypertension

subjects.

We recruited 6 subjects to participate in a 1-month walking therapy trial, who were randomly assigned to the afternoon group (AG) and the comparative group (CG). In AG, subjects would have the walking exercise when their deep body temperature came to its peak in terms of circadian rhythm. In CG, subjects could choose to have the walking exercise in the morning or evening according to their own schedule. One-way ANOVA were used to test if the walking is effective in BP control for each individual. For the AG and CG, the differences between the baseline BPs and the BPs during 1-month walking therapy were then compared by two sample unpaired Student t test. According to One-way ANOVA, both AG and CG have a decreased systolic BP in the morning and evening before sleep ($p < 0.05$), but have little influence on daytime BPs, which may also be influenced by the social factors. According to the Student t test, it suggests that the walking therapy in the afternoon might have a better effect on lowering the systolic BP in the morning and evening ($p < 0.05$), and also on lowering the diastolic BP in the evening ($p < 0.05$).

The results of the trials suggest the possibility of attaining a better effect in BP control by adjusting the timing of walking according to personal circadian rhythm.

要 旨

平成 23 年度の高血圧患者数は 907 万であり、治療を受けていない高血圧前症を含めると、推定 4000 万人以上とも言われている。高血圧前症のヒトに対して、高血圧にならないための適切な血圧改善手段が必要である。歩行など有酸素運動の血圧改善効果は多くの研究により示されたが、体格や運動開始時間の違いにより内分泌の反応も異なり、血圧改善に及ぼす可能性がある。そこで、本研究はサーカディアンリズムを念頭に運動開始のタイミングに注目し、血圧改善の効果を検討した。6 名の高血圧前症がある対象者が、サーカディアンリズムに基づいた高体温期に運動する午後組及び朝または夜に歩行運動する対照組に分類し、一ヶ月の歩行運動を実施した。One-Way ANOVA 及び Student t test によって、歩行運動は朝及び夜の収縮期血圧の改善に有効であったが ($p < 0.05$),

昼間の血圧改善の効果は少かった。さらに、午後組は対照組に比べて、収縮期血圧の改善がより大きい可能性も示した。