

Potential role of high-stress employment in hypertension

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Lesson

We report a patient with a reduction in blood pressure through cessation of high-stress employment.

Keywords

Stress, burnout, hypertension

Introduction

In the United States, the overall age-adjusted prevalence of hypertension ($\geq 140/90$ mm Hg) is 28.6%. While 81.9% of US adults with hypertension are aware of their status, only 53.3% have controlled their blood pressure to $< 140/90$ mm Hg.¹ Unfortunately, pharmacologic intervention is only expected to reduce systolic blood pressure by a weighted mean difference of 8.0 mm Hg.²

Sixty per cent of executives, managers and professionals spend > 72 hours per week working,³ despite evidence that productivity drops at over 50 hours per week of work.⁴ Work can be a source of stress⁵ which raises the blood pressure.⁶ While the relationship between employment and stress is assumed, we had a unique opportunity to explore the ability of voluntarily ceasing employment to reduce the blood pressure.

Case report

A United States-based 36-year-old healthy male executive presented with prehypertension that we attributed to employment-related stress. The patient decided to voluntarily cease employment, and we designed a non-randomised study to track vital measures due to this change. Blood pressure and pulse were taken three times per day in triplicate for three months before leaving employment (Omron 7 Series: Kyoto, Japan). Prior to the vitals measurement, the subject rested for 5 min. After the patient voluntarily ceased employment, a one-year washout strategy was executed. This washout period involved the patient and his family selling nearly all of their personal belongings and moving to New Zealand to live in a 1983 converted Japanese school bus (Figure 1(a)). At the end of the

washout period, the patient collected vital signs again using a similar paradigm to the employment vitals. Data were determined to be non-parametric by a Shapiro-Wilk test and thus non-parametric analyses were performed.⁷ Data values are reported \pm SEM.

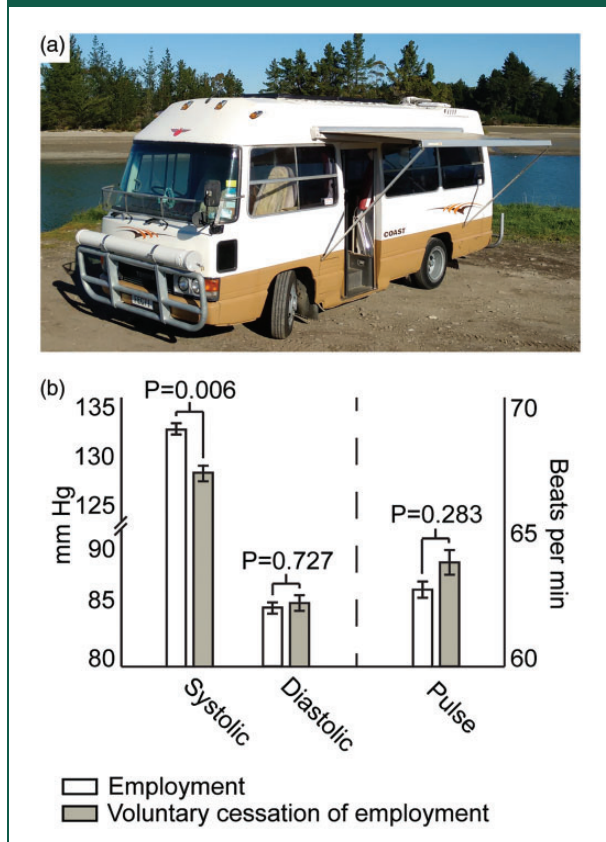
Figure 1(b) compares the vital measures during employment and after the post-employment washout period. There is a reduction of systolic blood pressure following voluntary withdrawal from the workforce (132.6 ± 0.6 to 128.8 ± 0.9 mm Hg; Mann-Whitney Rank Sum Test; $p = 0.006$). Diastolic blood pressure (83.9 ± 0.6 to 84.6 ± 0.8 mm Hg; Mann-Whitney Rank Sum Test; $p = 0.727$) and pulse rate (62.7 ± 0.4 to 64.1 ± 0.7 beats per minute; Mann-Whitney Rank Sum Test; $p = 0.161$) remained statistically similar. The patient reported no change in diet and exercise routine staying constant. Thus, voluntary cessation of employment was associated with reduced systolic blood pressure, reducing his risk of becoming hypertensive.

Discussion

By 2020, 30% of the world population will have hypertension.⁸ There are numerous ways to manage blood pressure, including dietary improvement, physical exercise and pharmacologic intervention. For pre-hypertensive or hypertensive patients who already adhere to dietary restrictions and incorporate physical exercise, there are few other options beside pharmacologic intervention. These pharmacologic interventions are not devoid of compliance challenges, and 29% of hypertensive individuals forgo appropriate drug dosing because of the concomitant negative side effects of the therapeutics.⁹

Here, we describe a patient whose pre-hypertension was successfully treated with voluntary cessation of employment. Importantly, his reduction in systolic blood pressure through voluntary cessation of employment is similar to the 4.2 mm Hg systolic blood pressure reduction expected through adherence to recommended dietary guidelines for patients with cardiovascular disease.¹⁰ It has been suggested that such a

Figure 1. (a) The bus our subject and family travelled and lived in during the one-year washout period in New Zealand; and (b) vital measures during the employment period and after voluntary cessation of employment showed a statistically significant reduction in systolic blood pressure through implementing the voluntary cessation of employment.



seemingly small reduction of systolic blood pressure lowers the risk of a fatal stroke by more than 50%.

The results of this case report are limited by the change in geography and other potential confounding factors such as potential underreported change in diet or physical activity. As blood pressure is the result of multiple factors including diet, stress, medication and physical activity, controlling all of these variables is challenging. Despite these potential confounding factors, this case report presents a unique view into the potential role of employment-related stress and elevated blood pressure.

Finally, we did suggest to the patient that it would be scientifically beneficial to us for him to crossover back to the employment arm of the study. We explained that this crossover would allow us to more strongly establish the role of employment in the previous pre-hypertensive state. The patient declined that extension of this study with an emphatic, 'Hell no'.

Declarations

Competing Interests: None declared.

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Ethical approval: Written informed consent for publication was obtained from the patient.

Guarantor: EJB.

Contributorship: EJB and BAB designed the study, collected the data, performed the analyses and wrote the manuscript. BAB designed the study and wrote the manuscript.

Provenance: Not commissioned; peer-reviewed by Camelia Diaconu.

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