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Correspondence

Regular exercise as an adjunct to antihypertensive therapy

For the sake of completeness, the observational study which included interviews of hypertensive patients regarding their views on aspects of hypertension [1] should have included in-depth discussions with those patients regarding their awareness of the beneficial effects of regular exercise. Among patients with hypertension, one benefit of exercise might be the opening up of the possibility of weaning the patient off thiazide diuretics, or using exercise, instead of thiazide diuretics, as an adjunct to antihypertensive medication.

Although thiazide monotherapy generates a fall in systolic blood pressure(SBP)and diastolic blood pressure(DBP) this fall is comparable to the fall in those parameters generated by regular aerobic exercise. In the Cochrane Review of thiazide antihypertensive monotherapy chlorthalidone 12.5–15 mg/day monotherapy generated a mean fall in SBP by 10.1 mmHg (95% Confidence Interval 6.3 to 13.9 mmHg), and a fall in DBP by 2.6 mmHg (95%CI 0 to 5.1 mmHg). Chlorthalidone 25 mg/day generated a fall in SBP by 13.6 mmHg (95% CI 11.3 to 16.0 mmHg), and a fall in DBP by 4 mmHg (95% CI 2.3 to 5.7 mmHg). In the same review hydrochlorothiazide 12.5 mg/day generated a mean fall in SBP by 6.3 mmHg (95% CI 5.3 to 7.2 mmHg) and a fall in DBP by 3.1 mmHg (95% CI 2.5 to 3.7 mmHg). At the 25 mg/day dose the SBP fell by a mean value of 8.0 mmHg(95% CI 7.- to 9.0 mmHg), and the DBP fell by 3.3 mmHg (95% CI 2.8 to 3.8 mmHg) [2]. The "downside" of thiazide use is that both chlorthalidone, 12.5–25 mg/day [3] and hydrochlorothiazide, 25 mg/day [4,5] activate the renin aldosterone angiotensin system(RAAS), with the attendant risk of myocardial fibrosis [6], and, hence, diastolic heart failure.

According to a narrative review of 27 randomised controlled trials on individuals with hypertension, comparable falls in SBP and DBP can be achieved by regular aerobic exercise. That review showed that regular medium to high intensity aerobic activity reduces the systolic blood pressure by a mean of 11 mmHg and the diastolic blood pressure by a mean value of 5 mmHg. The type of exercise included walking, jogging, swimming, and cycling [7]. Even hypertension which persists at 140/90 mmHg or more in spite of 3 antihypertensive medications (so-called "resistant" hypertension) can be ameliorated by regular aerobic exercise [8]. In the latter study 50 subjects with resistant hypertension were randomly allocated to participate or not participate in an 8–12 week treadmill exercise program which was well tolerated by all the subjects. Exercise significantly ($P = 0.03$) decreased daytime ambulatory SBP and DBP by, on average, 6 mmHg and 3 mmHg, respectively [8].

Regular exercise also reduces myocardial stiffness, thereby mitigating the risks of subsequent diastolic heart failure [9]. In the latter study sixty one (48% male) healthy participants(all in sedentary occupations) of mean age 53 were randomly allocated to either 2 years exercise training ($n = 34$) or attention control (control = 27). In each subject measurements were made of left parameters of left ventricular stiffness. Maximal oxygen uptake was measured to quantify changes in fitness. Fifty three subjects completed the study. Adherence to prescribed exercise was 88% on average. As a result of exercise training left ventricular stiffness was significantly ($P = 0.0018$) reduced in comparison with its pre-existing value. This parameter did not change in the control group. Exercise also significantly ($P < 0.001$) increased the left ventricular end-diastolic volume, whereas pulmonary capillary wedge pressure was unchanged. The consequence was a significant ($P = 0.007$) increase in stroke volume for any given filling pressure. The authors concluded that regular exercise could reduce the risk of future heart failure with preserved ejection fraction by mitigating the risk of myocardial stiffness attributable to sedentary lifestyle [9].

In view of the fact that the blood pressure lowering effect of regular aerobic exercise is comparable to the antihypertensive effect of thiazide diuretics, some hypertensive patients might benefit from a regime whereby regular exercise was substituted for thiazide diuretics. Alternatively, instead of add-on thiazides, exercise could be used as "add on" therapy if hypertension is not adequately controlled either with angiotensin converting enzyme inhibitors (or angiotensin receptor blockers) and/or calcium channel blockers. That strategy would mitigate the risk of RAAS-related myocardial stiffness, and also confer the additional benefit of reversing any pre-existing myocardial stiffness.

Finally, if resort to thiazide "add on" therapy proves to be inescapable, low-dose chlorthalidone 6.25 mg/day or low-dose controlled-release hydrochlorothiazide 12.5 mg/day would be worthy of consideration, over and above the use of "add on" exercise. In 12-week comparative, double-blind, outpatient study which enrolled 54 patients with stage 1 hypertension were randomised to chlorthalidone 6.25 mg/day ($n = 16$), hydrochlorothiazide(HCTZ) 12.5 mg/day ($n = 18$), or HCTZ-CR ($n = 20$). In that study both chlorthalidone and HCTZ-CR significantly ($P < 0.01$) reduced 24 h ambulatory blood pressure [10]. The magnitude of RAAS activation at those doses would be worthy of interest.

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Oscar M.P. Jolobe, MRCP(UK)
Manchester Medical Society, Simon Building, Brunswick Street, Manchester M13 9PL, United Kingdom of Great Britain and Northern Ireland.
E-mail address: oscarjolobe@yahoo.co.uk.

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The authors respond: Public health intervention in the ED for hypertension

We thank Mr. Oscar M. Jolobe for the interest in our article. Exercise is certainly a highly beneficial activity, and an emergency department visit does indeed present an opportunity for promoting such prevention strategies. Emergency departments are increasingly being asked to deploy public health interventions such as HIV testing with risk reduction counseling, and mental health and substance abuse screening among others. We posit that substantial barriers remain to achieving the behavior change required to improve health outcomes through a brief intervention. There is a considerable need for research, practice, and policy change to balance the competing missions of acute care and public health, identify the resources required for emergency departments to adopt a public health mission, and promote linkage to more appropriate venues for longitudinal interventions needed to achieve sustained behavior change.

W. Tyler Winders, MD*
Department of Emergency Medicine, Medical University of South Carolina, United States of America
Corresponding author.
E-mail address: waw201@musc.edu.

Kimberly Hart, MA
Christopher Lindsell, PhD
Department of Emergency Medicine, Vanderbilt University, Nashville, TN, United States of America
E-mail address: kim.hart@vumc.org.

Michael Lyons, MD, MPH
Opeolu Adeoye, MD
Department of Emergency Medicine, University of Cincinnati, Cincinnati, OH, United States of America
E-mail address: lyonsme@ucmail.uc.edu, adeoyeo@ucmail.uc.edu

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Cranial CT of nontrauma emergency department patients

I have greatly enjoyed reading the recently published article by Covino et al. [1]. In this retrospective study, the authors evaluated 1156 patients presenting to the ED for neurological deficit, postural instability, acute headache, altered mental status, seizures, confusion, dizziness, vertigo, syncope, and pre-syncope. The authors built a score for positive cranial computed tomography prediction by using a logistic regression model on clinical factors significant at univariate analysis. I congratulate the authors for their successful article. However, I have some concerns about article. First, this study was retrospective and did not include ED patients who did not undergo cranial computed tomography. Therefore, it must be stressed that the true effect of applying these clinical predictors cannot be assessed. There is need for prospective validation of the clinical predictor variables that identified in this consecutive series of ED patients with nontraumatic neurologic symptoms who did undergo cranial computed tomography. Second, as a result of the retrospective nature of this study, patient assessment and documentation of clinical findings were not standardized. Finally, owing to the retrospective design of the study, there was no standardization of the terminology contained within the computed tomography requisitions.

Arsal Acarbaş
Muğla University, Faculty of Medicine, Department of Neurosurgery, Turkey
E-mail address: arsal5@hotmail.com.

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The author responds: The need for prospective studies of cranial CT for ED head trauma patients

Dear Sir,

I sincerely appreciate your interest in our work, and I thank you for the questions about our paper. In our study we retrospectively reviewed clinical data of 1156 patients presented to our ED for several clinical condition non-related to trauma, and build a score for positive cranial CT scan prediction in the ED setting. We furtherly validated our score on a prospective population of 508 patients.

Our data confirmed that risk stratification could reasonably reduce head CT utilization in the emergency department patients, keeping high standards of sensitivity.

In the first point of your letter you underline that the true effect of applying this clinical predictor could not be assessed since we did not include patients that did not undergo CT scan. However since the purpose of our work was to give a tool to emergency physicians to reduce just urgent head CT scan in the ED, we think that the design of our study is adequate to our endpoint. Furthermore it would be very difficult to design a study were every patient should undergo a urgent head CT scan regardless of clinical evaluation and physician judgement. So, in our opinion, the true incidence of any head CT rule cannot be mathematically estimated at 100% in the real world.