Hypertension Highlights

It's Still the Blood Pressure -- Although What It Is and How to Treat It Remain Contentious

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Introduction

In late-breaking news, the American Society of Hypertension, the largest US group dedicated to hypertension, is severing its affiliation with the American Journal of Hypertension. The split ends months of discussion and tension between the approximately 3000 Society members and the Journal's Editor and cofounder of the Society. More details will follow in next month's Newsletter. In the meantime, Framingham Heart Study data show treatment and control of hypertension is poor in people aged > 80 years, although > 70% of this elderly population are hypertensive -- possibly because hypertension is asymptomatic, the drugs are expensive, or physicians fear drug interactions or think there will be little benefit. The blood pressure-independent properties of ACE inhibitors and CCBs have been reconfirmed in a meta-analysis from Italy -- but there is no need for more analyses, says Norman Kaplan, MD. A study from California shows 1 in 3 patients are discharged after an ischemic stroke or TIA without being prescribed any antihypertensive therapy -- meaning more awareness of guidelines and study evidence are needed. "Prehypertension" is back -- it has been shown to increase cardiovascular morbidity, regardless of any other cardiovascular risk factors. A Seattle newspaper claims writers of US and international guidelines are simply widening the market for new, expensive antihypertensive drugs, because they are in the pay of pharmaceutical companies. Finally, 2 ways to reduce your blood pressure (especially if you are elderly): Eat dark chocolate daily while walking on cobblestones!

Blood Pressure Control Poor Among Elderly, Especially Women

Over 70% of people aged > 80 years in the United States have hypertension, but only 38% of men and 23% of women in this age group are controlled to levels < 140/90 mm Hg, according to a new study published in the July 27 issue of JAMA.[1] The study also showed that the majority of people in the >/= 80 year-age group who were being treated were taking only 1 antihypertensive drug and that only a minority of these patients were on a thiazide-type diuretic.

The study was based on data collected during the landmark Framingham Heart Study. Donald M. Lloyd-Jones, MD, ScM (Northwestern University, Chicago, Illinois), and colleagues analyzed data from a sample of 5296 participants (2317 men and 2979 women) that included 1932 people aged >/= 80 years.

Among these participants, the prevalence of hypertension (defined as systolic blood pressure [SBP] >/= 140 mm Hg or diastolic blood pressure [DBP] >/= 90 mm Hg or antihypertensive drug use) increased markedly with age, rising to 74% in people aged >/= 80 years. Only 6.9% of this older-age group were classified as having normal blood pressure (< 120/< 80 mm Hg); the remaining 19.1% were classified as having prehypertension (SBP 120-139 mm Hg and/or DBP 80-89 mm Hg).

Drug treatment for hypertension increased with age, rising to 74.2% of the >/= 80-year-old age group. However, the
number of antihypertensive drugs being used was similar across all age groups. Approximately 60% of treated patients were taking only 1 drug, 30% were taking 2, and only 10% were taking >/= 3 medications. Use of thiazide-type diuretics increased with age, although only 23% of men and 38% of women aged >/= 80 years were taking these drugs. Use of calcium channel blockers (CCBs) and beta-blockers, highest in people aged 60-79 years, decreased in older persons. Angiotensin converting enzyme (ACE) inhibitor use declined with age, although the rate (33%) in the >/= 80-year-old group was higher than expected, since ACE inhibitors have not conclusively been shown to be beneficial in older patients, the investigators comment. Older men were more likely to be on an alpha-blocker, probably due to concomitant symptoms of prostatism.

About half (47%) of all treated patients had their blood pressure controlled, but this rate declined with age and was even lower in older women than older men (23% vs 38%, respectively). Relative risks for cardiovascular disease associated with increasing blood pressure stage did not decline with age, and absolute risks increased markedly. In the group aged >/= 80 years, major cardiovascular events occurred in 9.5% of those with normal blood pressure, 19.8% of those with prehypertension, 20.3% of the stage 1 hypertension group, and 24.7% of the stage 2/treated hypertension group.

Dr. Lloyd-Jones and colleagues stress that as the population ages, "urgent public health efforts are needed for patients and physicians to improve awareness of risks of hypertension at older ages, and strategies and benefits of therapy, and importance of achieving blood pressure reduction, if possible to get goal blood pressure levels." They acknowledge that physicians may be reluctant to treat older patients aggressively because of perceived lower benefits or the possibility of increasing the risk of adverse effects. Cost is another concern, although a number of inexpensive, highly effective, once-daily medications, such as thiazide-type diuretics, are available, as well as increasing numbers of combination pills containing different doses of standard agents, the authors point out.

Study coauthor Daniel Levy, MD, Director of the Framingham Heart Study, emphasized that controlling blood pressure in older patients "may make the difference between living many more healthy years, or spending those years recovering from a debilitating stroke or heart attack."

**Elderly Hypertensives Neglect Medication for Treatment of Other, Noncardiovascular Illnesses**

Underuse of antihypertensive drug treatment in the elderly has been widely reported (see above). Now a study from researchers at Brigham and Women's Hospital, Harvard Medical School (Boston, Massachusetts), published in the August issue of Hypertension, suggests that one reason for this underutilization is the presence of noncardiovascular comorbidities, such as osteoarthritis, asthma, depression, and gastrointestinal disorders. All these conditions are highly prevalent in the elderly and, according to the results of this study, are also significantly associated with diminished use of antihypertensive medication in older people.

The retrospective cohort study was carried out using data from 51,517 patients aged >/= 65 years who were enrolled during 1999 and 2000 in the Pennsylvania Pharmaceutical Assistance Contract for the Elderly (PACE) Program. Approximately half the subjects were aged 75-84 years. All were hypertensive, plus they had diagnoses and used treatments that allowed them to be entered into 1 of 5 mutually exclusive cohorts: asthma/chronic obstructive pulmonary disease (COPD); depression; gastrointestinal disorders; osteoarthritis; or none of the 4 comorbidities.

The frequency of antihypertensive drug use (defined as filling >/= 1 prescription) in 2000 was assessed for each cohort and the independent effects on antihypertensive use of the 4 comorbidities of interest, plus sociodemographic characteristics, other cardiovascular and noncardiovascular comorbidity, and healthcare utilization variables were examined.

Compared with patients with none of the 4 noncardiovascular morbidities, the tendency to take antihypertensive medication was found to be:

- 57% less likely in patients with asthma/COPD;
- 50% less likely in those with depression;
- 41% less likely in those with gastrointestinal disorders; and
- 27% less likely in those with osteoarthritis.
Reduced antihypertensive use was also associated with older age, female gender, white race, more severe degree of other comorbidities, absence of some cardiovascular indications, hospitalizations, nursing home care, physician visits, and use of fewer other medications. Use of antihypertensive medications increased in the presence of coronary artery disease or diabetes.

Lead author Philip S. Wang, MD, and colleagues suggest that the reasons for the reduced antihypertensive use found in this study may be related to patients' lack of time and resources. Patients and physicians may give priority to symptomatic comorbidities and elderly patients may be constrained by financial hardships that lead them to discontinue antihypertensive medication. Physicians may be apprehensive about interactions -- real or otherwise -- between antihypertensive drugs and the drugs used to treat the comorbidities.

The study authors suggest that these problems could be tackled by wider dissemination of information about the use of antihypertensive medication in patients with comorbidities through guidelines and consumer advertising. Expanded drug coverage may ease financial difficulties, and drug utilization review programs could alert physicians to suboptimal antihypertensive use. However, all of these may be needed if the quality of hypertension care and the clinical outcomes of vulnerable elderly with comorbidities are to be improved, Dr. Wang and his colleagues believe.

In an accompanying editorial,[3] Jan A. Staessen, MD (University of Leuven, Belgium), and coauthors say that this "enlightening" study should remind patients and healthcare providers that "the overwhelming benefits of early versus delayed blood pressure control" also apply in the presence of symptomatic noncardiovascular disorders. They warn that "By monopolizing attention and therapeutic endeavor, noncardiovascular illnesses in aging populations might become a barrier to efficient antihypertensive drug treatment and herald the return of hypertension as the 'silent killer.'" They suggest 2 ways by which adherence to treatment could be improved: self-measurement of blood pressure and the wider use of combination tablets.

**Blood Pressure-Independent Properties of ACE Inhibitors and Calcium Channel Blockers Reconfirmed in New (and Last?) Meta-Analysis**

The latest meta-analysis of antihypertensive drug trials has reconfirmed the importance of lowering blood pressure for protection against coronary heart disease (CHD) and stroke, but also the blood pressure-independent benefits of ACE inhibitors and CCBs on CHD and stroke, respectively.

Reporting their results in the August issue of *Hypertension*,[4] Paulo Verdecchia, MD (University of Perugia, Italy), and colleagues describe how they extracted summary statistics regarding CHD (composite of myocardial infarction and coronary death) and stroke from 28 outcome trials that compared either ACE inhibitors or CCBs with diuretics, beta-blockers, or placebo. All the trials were published prior to December 2004 and involved a total of 179,122 patients, 9509 incident cases of CHD, and 5971 cases of stroke.

Compared with placebo, regimens based on ACE inhibitors lowered CHD risk by 21% (P < .001) whereas CCBs were associated with a nonsignificant 17% reduction in CHD risk. There were no significant differences in CHD risk between regimens based on diuretics/beta-blockers and regimens based on ACE inhibitors or CCBs. Only CCB-based regimens were associated with significant reductions in the risk of stroke compared with placebo (35%; P < .001) or diuretics/beta-blockers (8%; P = .041).

Meta-regression analysis showed that blood pressure reduction had similar effects on the prevention of CHD and stroke (15% per 10 mm Hg). However, prevention of CHD was related to SBP reduction (P < .001) and use of ACE inhibitors (P = .028), whereas prevention of stroke was related to SBP reduction (P = .001) and use of CCBs (P = .042).

Dr. Verdecchia and colleagues conclude from their analysis that blood pressure lowering "holds center stage in the prevention of major cardiovascular complications in patients with hypertension or at high cardiovascular risk." Combination therapy with ACE inhibitors and CCBs could provide "a rationale for a broad-spectrum cardiovascular prevention," they suggest.

"Enough already!" seems to be the reaction to yet another analysis of antihypertensive drug trials in an accompanying editorial commentary by Norman M. Kaplan, MD (Southwestern Medical Center, Dallas, Texas).[5] Dr. Verdecchia's analysis updates the 2 most recent overviews of antihypertensive drug trials[6,7] and no more meta-analyses of currently completed trials are needed, Dr. Kaplan declares. The primary clinical need now is to lower...
blood pressure, especially SBP, more effectively, he says. Since "current practice is woefully inadequate," more intensive therapy is clearly needed. Patients will need at least 2 drugs, preferably with a diuretic as the first choice. "The future of drug therapy belongs to prevention and to intensive management of all cardiovascular risk factors, particularly dyslipidemia," Dr. Kaplan asserts. "It is time to move on," he states firmly.

**Failure to Prescribe Antihypertensive Medications at Discharge After an Acute Ischemic Cerebrovascular Event**

A study of representative hospitals in California has found that 1 in 3 patients are discharged after an ischemic stroke or transient ischemic attack (TIA) without being prescribed any antihypertensive therapy, University of California investigators report in *Stroke.*[^8] Lowering blood pressure among stroke survivors is known to reduce the risk of another stroke, even among survivors with normal blood pressure. Nevertheless, blood pressure control in stroke survivors has been shown to be poor.[^9]

Bruce Ovbiagele, MD (UCLA Medical Center, Los Angeles, California), and colleagues at the University of California, San Francisco, analyzed data from patients diagnosed with ischemic stroke or TIA at 11 hospitals in the state of California over two 3-month periods in 2003 and 2004. The data were collected by the California Acute Stroke Prototype Registry (CASPR). A total of 764 stroke or TIA patients were identified, of whom 69.4% (530 patients) received a discharge prescription for an antihypertensive drug. This rate varied among hospitals, ranging from 55% to 100%. Just over half of the patients discharged (59.3%) had a prescription for 1 or 2 antihypertensive drugs, 7.9% had a prescription for 3 drugs, and 2.2% a prescription for >/= 4 drugs. ACE inhibitors were the most prescribed class of antihypertensives, in 303 patients (39.7%). The most prescribed combination regimen was an ACE inhibitor plus a beta-blocker, in 59 patients (23%).

Statistical analysis showed that patients were more likely to be prescribed antihypertensive medication at discharge if they had a history of hypertension (P < .0001), diabetes (P < .0009), or were older (> 73 years vs

Dr. Ovbiagele and colleagues caution that although these results might seem encouraging at first sight -- two thirds of patients were discharged on at least 1 antihypertensive drug -- evidence from other studies suggests "ineffective implementation or suboptimal long-term maintenance of these therapies" in stroke survivors. The California investigators believe that the results of their study reflect a national trend. Physicians should be more aware of the guidelines as well as recent studies showing the importance of blood pressure control in all stroke patients, Dr. Ovbiagele said. He urged "a concerted effort, involving patients and their doctors, to make sure that patients do not leave the hospital without being on at least a blood pressure agent to reduce their risk for secondary stroke."

"Prehypertension" Shown to Increase Risk of Cardiovascular Morbidity

People who have blood pressure that falls within the "prehypertensive" range (SBP 120-139 mm Hg or DBP 80-90 mm Hg) have an increased risk of major cardiovascular events regardless of whether they have any other cardiovascular risk factors, according to a study published in the July/August issue of *Annals of Family Medicine.*[^10]

Since the introduction of the "prehypertension" category in 2003, in the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7),[^11] opinions have been varied as to its clinical and health implications. There has been criticism of the perceived creation of another group of "sick" people from those who were previously considered to have "normal" blood pressure. Other national and international hypertension guidelines, including the latest classification proposed by the American Society of Hypertension,[^12] have failed to take up this new blood pressure category. To date, there have been few studies specifically investigating the relation of prehypertension to cardiovascular morbidity and the results have been somewhat conflicting. The investigators who carried out the latest study, an analysis of data from a longitudinal, nationally representative cohort of US citizens, believe that their results support the classification established in JNC 7 and endorse the recommendations of lifestyle modifications for all patients in this category to prevent the development of hypertension.

Heather A. Liszka, MD (Medical University of South Carolina, Charleston), and colleagues analyzed data from 8986 men and women who participated in both the first National Health and Nutrition Examination Survey (NHANES I), which was carried out during 1971-1975, and the National Health Examination and Follow-up Study (NHEFS), which evaluated surviving participants regularly up until 1992. Blood pressure status, based on measurements taken during NHANES I, showed that 47% of the sample population were prehypertensive and 20% had normal blood pressure (SBP < 120 mm Hg and DBP < 80 mm Hg).

[^8]: Stroke. 2006;37(5):948-954
[^9]: Hypertension. 2002;40(5):1221-1226
[^11]: JNC 7. 2003
[^12]: American Society of Hypertension. 2003
After adjustment for age, gender, and race and all cardiovascular risk factors as defined by JNC 7, prehypertensive participants were found to have a 32% increased risk of a major cardiovascular event (myocardial infarction, stroke, or congestive heart failure) over 18 years of follow-up compared with those with normal blood pressure. This risk was increased to 37% in participants with prehypertension and \( \geq 1 \) cardiovascular risk factor.

Further analysis showed that participants at the higher end of the prehypertension category ("high normal blood pressure," SBP 130/139 mm Hg and DBP 85-89 mm Hg) had an even greater increase in risk of cardiovascular disease (42%), whereas in those with "low prehypertension" (SBP 120-129 mm Hg and DBP 80-84 mm Hg), the increase (24%) was not significant.

Dr. Liszka and colleagues point out that the population sample they studied represented "clinical reality in that most (93%) of the prehypertensive population had \( \geq 1 \) cardiovascular risk factor," which increased the risk of major cardiovascular events regardless of whether they had low prehypertension or high normal blood pressure. "Prehypertension should serve as an early warning for patients and clinicians that metabolic changes which ultimately lead to cardiovascular disease may well be underway," the investigators stress.

In an accompanying editorial, Lee Green, MD, MPH (University of Michigan, Ann Arbor), who was one of the authors of the JNC 7 report, says that the findings of this study represent a direct challenge to physicians about the way they practice.\(^{[13]}\) "We tend to accept or ignore not-quite-controlled blood pressure more than is good for our patients – even blood pressure that is hypertensive, let alone prehypertensive," he says. The clear demonstration of the harm that even prehypertension does to patients "may help reframe our thinking and perhaps encourage us to overcome our clinical inertia to act appropriately on an above-goal blood pressure reading at an office visit," he believes.

Physicians need answers to many questions about prehypertension, Dr. Green says, such as how the category should be regarded and what interventions can be carried out in the clinician's office, which member(s) of the healthcare team should deliver them, and how they fit into the patient's other healthcare needs. "We cannot rely on answers from referral centers or hypertension specialists being either effective or sustainable in our practices," Dr. Green maintains, urging family physicians to "step forward" to create the knowledge about prehypertension that both physicians and patients need, "in academic departments and in practice-based research networks."

Guideline Writers Accused of Widening Market for New, Expensive Antihypertensive Drugs

In the first of a series of articles entitled "Suddenly Sick," The Seattle Times (Washington) mounted an attack on the specialists who wrote the US National Institutes of Health (NIH) and World Health Organization (WHO) guidelines on hypertension.\(^{[14]}\) The article, subtitled "What can go wrong when the drug industry influences what constitutes disease, who has it, and how should it be treated?," was published in the June 26 issue of the newspaper and implied that links that US and European guideline panel members have with pharmaceutical companies have influenced the development of new classifications of hypertension that define more people as "sick" and recommendations for treatment with a range of newer, more expensive drugs.

The article's author, Seattle Times staff reporter, Duff Wilson (now with The New York Times), asserted that "behind each of those [NIH and WHO] panels were the giant pharmaceutical companies that manufacture the new and expensive hypertension drugs." Wilson described the original 1999 WHO guidelines\(^{[15]}\) (since updated\(^{[16]}\)) as "an ideal marketing tool for drug companies" that was created "behind closed doors" by a committee led by members who "insisted on lower blood pressure targets and made sweeping statements endorsing the safety of newer drugs." All but 1 of the 18 committee members had "close financial ties to drug firms," he said. Despite the WHO's support for the new guidelines, he maintained, over 800 physicians, pharmacists, and scientists from 58 countries signed a joint petition protesting the guidelines, claiming that "the committee had misrepresented medical evidence and that the WHO had 'failed its responsibility' to improve care and prevent unnecessary deaths."

The NIH guidelines, Wilson continued, "are now being used by drug companies to encourage people to spend more money." The 2003 guidelines, JNC 7,\(^{[11]}\) he implied, have led to doctors prescribing more drugs, possibly even dangerous ones, to reach the lower blood pressure goals set forth by the report. He contrasted JNC 7 with the Antihypertensive and Lipid-Lowering treatment to prevent Heart Attack Trial (ALLHAT),\(^{[17]}\) which, he said, concluded that "the newer blood-pressure drugs are less safe, usually no more effective and far more expensive than decades-old drugs such as diuretics." Despite the "scientific proof," he said, diuretics will lose 35% of their share of the blood pressure market between 1998 and 2007 because "diuretics cost pennies a day and bring minimal profit, so drug makers have little economic interest in promoting this cheap, effective treatment." In the meantime, according to Wilson, "it is indisputable that many patients have been sold pills that can lead to more strokes or heart attacks than
A response to this article, by Beverly B. Green, MD, MPH (Group Health Cooperative and University of Washington, Seattle), who declared no financial associations with the pharmaceutical industry, was published in the July 14 issue of the Times. While Dr. Green applauded the newspaper for addressing serious issues connected with the "pharmaceutical influence on health expenditures and the potential for overtreating patients without benefit," she stressed that some of the information about the negative influences of pharmaceutical companies in the original article was oversimplified. She warned that it might lead patients with hypertension not to take their medications, in which case they would certainly become "suddenly sick." Patients need to trust that they will benefit from taking their medications and that raising concerns about pharmaceutical company "plots" erodes that trust, Dr. Green warned. There may be good reasons why a patient might need a more expensive or less-studied drug, she noted. "It is important for people to understand that it is the job of health plans and physicians to sort these matters out and assure patients receive the most efficacious drugs possible, with the least risk and the most potential for gain," she emphasized. Most guidelines recommend a diuretic as first-line antihypertensive treatment, Dr. Green noted. The problem with "this simple formula," she said, is that the average person with hypertension needs to take 2 to 3 medications to control their blood pressure, and therefore, more expensive, newer medications are added.

More "Good" About the Blood Pressure-Lowering Effects of Dark Chocolate

A report that was greeted enthusiastically by the mainstream press last month came from the University of L'Aquila, Italy, where investigators continue their research into the cardiovascular benefits of the flavanols (flavonoids) found in cocoa products. "Dark chocolate lowers high blood pressure!" and "Good news for dark chocolate lovers!" were just a few of the optimistic headlines referring to the latest study by Prof. Claudio Ferri, MD, and colleagues, who have found that flavonoid-rich dark chocolate reduces day- and nighttime blood pressure in patients with hypertension. The results of their study are published in the August issue of Hypertension.

Previous studies suggested that flavonoid-rich foods, including fruits, vegetables, tea, red wine, and chocolate, might offer cardiovascular benefits. Chocolate products have a higher total flavanol content on a per weight basis than many other plant-based foods and beverages, and the flavanols and other flavonoid components in chocolate have been shown to be rapidly absorbed in humans in a dose-dependent manner.

Earlier this year, Prof. Ferri's group reported that dark chocolate, but not white chocolate, reduced blood pressure and increased insulin resistance in healthy subjects. To confirm these effects in patients with hypertension, the effects of both types of chocolate were investigated in 20 never-treated patients with Grade 1 hypertension, as defined by the European Society of Hypertension/European Society of Cardiology classification (SBP 140-159 mm Hg or DBP 90-99 mm Hg) and in 15 normotensive controls. None of the subjects had diabetes or other disease, or smoked. All subjects refrained from consuming red wine or tea during the study.

After a 7-day chocolate-free run-in phase, all subjects were randomized to receive either 100 g per day of dark chocolate (Ritter Sport Halbbitter, Alfred Ritter GmbH), estimated to contain 88 mg of flavanols, or 90 g per day of flavanol-free white chocolate (Milka, Kraft Foods) for 15 days. After a second 7-day chocolate-free period, patients crossed over to the other treatment.

Noninvasive 24-hour ambulatory blood pressure measured at the end of each treatment showed that SBP decreased by 11.9 mm Hg (P < .0001) and DBP by 8.5 mm Hg (P < .0001). White chocolate had no effect on blood pressure. Separate analyses showed that dark chocolate, but not white chocolate, significantly reduced both daytime and nighttime SBP and DBP. Dark chocolate, but not white chocolate, was also associated with significant reductions in several measures of insulin resistance and a 10% reduction in LDL-cholesterol levels (P < .05).

This is one of the first clinical trials to look specifically at dark chocolate's effect on lowering blood pressure in people with hypertension. Although the results suggest that flavanols from cocoa products may provide some cardiovascular benefit, Prof. Ferri and his colleagues caution that it will only be effective if included as part of a healthy, calorie-balanced diet -- ie, this is not a license to consume large amounts of chocolate! They also caution that the chocolate used in their study (and in several other scientific studies of dark chocolate) differs markedly from most commercially available cocoa or chocolate confectionery, which has very low flavanol content. Another study author, Jeffrey B. Blumberg, PhD (Tufts University, Boston, Massachusetts), noted that most Americans eat milk chocolate, which has a low concentration of these compounds.

Speculating on mechanisms of action, Prof. Grassi and other researchers suggested that the regulation of nitric
oxide (NO) production by the flavanols in the dark chocolate could account for its effects on both blood pressure and insulin sensitivity. In an editorial accompanying the group's earlier study, Cesar G. Fraga, PhD (University of California, Davis), suggested that this action may be mediated by insulin- or oxidant-mediated cell signaling, or it might involve the renin-angiotensin system through inhibition of ACE. These potential mechanisms may be physiologically related, Dr. Fraga suggested.

**Improving Physical Function and Blood Pressure in Older Adults Through Cobblestone Mat Walking**

A surprising reduction in blood pressure has been achieved in 16 weeks in a group of normally physically inactive elderly men and women who had regular sessions of walking on mats that replicated smooth, rounded cobblestones, Oregon researchers report in the August issue of the *Journal of the American Geriatrics Society*. The idea that walking on cobblestones might be beneficial to health came from Chinese holistic medicine and the principles of reflexology. The uneven surfaces of the cobblestones are said to stimulate and regulate "acupoints" located on the soles of the feet. Although anecdotal evidence existed about the health benefits of cobblestone walking, no controlled studies to evaluate its efficacy had previously been undertaken. An 8-week pilot study by Fuzhong Li, PhD (Oregon Research Institute, Eugene), and colleagues showed significantly greater improvements in several measures of mental and physical health, including blood pressure, compared with control subjects. Following these results, a trial was set up to compare the effects of cobblestone mat walking with conventional walking on physical function and blood pressure (the primary study endpoints) and quality of life (secondary endpoint). The study was carried out in 108 healthy, physically inactive, independent-living adults aged 60 to 92 years. These subjects were randomized to a cobblestone mat-walking program or a conventional walking program comprising 60-minute group exercise sessions 3 times per week for 16 consecutive weeks.

The cobblestone mats, measuring 6 feet by 1.5 feet, consisted of hard plastic replicas of smooth, small- to medium-sized river stones embedded randomly on the surface. The mats were placed on padded foam underlays. Walkers on the mats began a "core training protocol" through which they increased their walking time to a maximum of 30 minutes per session by the end of the second week of the study.

At the end of the 16-week intervention, significant differences were seen between the 2 exercise groups in a number of balance measures and blood pressure. The mat-walking group had significant greater decreases in SBP (*P* = .01) and DBP (*P* = .008) than the conventional walking group. Mean blood pressure at the end of 16 weeks was 126/73 mm Hg in the mat-walking group compared with 131/75 mm Hg in the conventional walking group.

Dr. Li and colleagues believe that cobblestone mat walking may represent a new therapeutic and health-enhancing exercise alternative for older adults. The Oregon Research Institute is offering prototype cobblestone walking mats for sale on its Web site ([http://www.ori.org](http://www.ori.org)). They cost US$25.00 plus US$10.00 for delivery in North America. However, they come with a caution that positive health benefits from using the mat cannot be guaranteed and use of the mat is at the purchaser's sole risk.

It is possible that outside China the mats will represent the only opportunity for walking over cobblestones in the future. The number of areas where people can walk on real cobblestones is declining. Concern about damage caused to buildings by traffic rumbling over cobbles, as well as a shortage of people with the skills to maintain them, means that many cobbled streets are being covered with asphalt.

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