First find out whether you're inclined to exercise-induced hypertension

Gage the impact of exercise on your cardiovascular system and check for hypertension increased by working out.

Credits: Anne Hart, Photography.

You can be thin, vegetarian, and a marathon runner and still have your arteries calcified, according to a March 14, 2007 press release from the University of Maryland Medical Center, "University of Maryland Researchers Find Heart Disease in a Marathon Runner: Is Too Much Exercise a Bad Thing?" (http://www.allvoices.com/s/event-4493253/aHR0cDovL3d3dy51bW0uZWR1L25ld3MvbWFyYXRob25fcnVu%20bmVyLmh0bQ==)

The press release doesn't say whether the person had been taking vitamin K-2 (MK-7) from natto, or whether the person had been taking too much vitamin D, which calcified his coronary arteries, or whether he had the particular genetic variation where taking a certain amount of vitamin D calcifies the aorta, or whether he inherited the risk to hardening of the arteries from his older family members. The study didn't mention whether or not the person drank a lot of homogenized milk or whether something he ate scarred the inside of his arteries which then became calcified.
The study didn't say whether he drank pomegranate juice to help reverse his condition or whether he took drugs or fish oil or even COQ-10. See the articles, "Pomegranate juice consumption reduces oxidative stress (http://www.ajcn.org/cgi/content/abstract/71/5/1062)," and "Pomegranate Reverses Arteriosclerosis and Slows the Progression of Prostate Cancer (http://search.lef.org/cgi-src-bin/MsmGo.exe?grab_id=0&page_id=3896&query=pomegranate&hiword=POMEGRANAT%20POMEGRANATES%20pomegranate)." Also see the article, "Preventing Vascular Disease - Life Extension (http://search.lef.org/cgi-src-bin/MsmGo.exe?grab_id=0&page_id=757&query=nhember%202009&hiword=2009%20NOVEMBERS%2020november%20)." None of these possibilities were mentioned. But what the press release did say was that the doctors at the University of Maryland Medical Center had a mystery on their hands.

Does this case remind you of the case of Jim Fixx? Consider Jim Fixx, best-selling author of The Complete Book of Running. After Fixx died in his early fifties while jogging, an autopsy revealed he had clogged arteries and an enlarged heart. See the September 30, 2009 New York Times article, "Phys Ed: How Do Marathons Affect Your Heart? - Well Blog - NYTimes.com (http://www.allvoices.com/s/event-4493253/aHR0cDovL3dlbGwuYmxvZ3MubmVl0aW1lcj5ib20vMjAwOS8wOS8zMC9waHlz%20LWVkLWhvdy1kby1tYXJhdGhvbntYWZmZWN0LiwtbGlnaG9uc2V5cmVqP2FwYWdl%20PTM=)."

When the researchers studied the runners’ scan results, they found that more than a third of the men showed evidence of significant calcification or plaque build-up in their heart arteries, according to the NY Times (http://www.allvoices.com/s/event-4493253/aHR0cDovL3dlbGwuYmxvZ3MubmVl0aW1lcj5ib20vMjAwOS8wOS8zMC9waHlz%20LWVkLWhvdy1kby1tYXJhdGhvbntYWZmZWN0LiwtbGlnaG9uc2V5cmVqP2FwYWdl%20PTM=) article. Several also had scarring of some of the tissue in their hearts.

Most researchers in various studies agree that regular marathon running seems not to protect runners from coronary artery disease. The big question is does exercise to the degree that marathon runners accomplish have deleterious effects on coronary arteries? Compare marathon running to walking 30 minutes a day and enjoying the sights.

According to the University of Maryland (http://www.allvoices.com/s/event-4493253/aHR0cDovL3dlbGwuYmxvZ3MubmVl0aW1lcj5ib20vMjAwOS8wOS8zMC9waHlz%20LWVkLWhvdy1kby1tYXJhdGhvbntYWZmZWN0LiwtbGlnaG9uc2V5cmVqP2FwYWdl%20PTM=) press release, A 51-year-old physician colleague who looked the picture of health—no cardiovascular risks, a marathon runner who had exercised vigorously each day for 30 years—had just flunked a calcium screening scan (http://www.allvoices.com/s/event-4493253/aHR0cDovL3dlbGwuYmxvZ3MubmVl0aW1lcj5ib20vMjAwOS8wOS8zMC9waHlz%20LWVkLWhvdy1kby1tYXJhdGhvbntYWZmZWN0LiwtbGlnaG9uc2V5cmVqP2FwYWdl%20PTM=) of his heart.

The patient had expected a score indicating a healthy cardiovascular system. Instead, the images indicated a high score: a build-up of calcium in his coronary arteries put him at high risk for blocked blood vessels and a possible heart attack.

The mystery was all the more intriguing because his resting blood pressure and fasting cholesterol levels, the usual measures of cardiovascular health, were in the normal range. The March 1, 2007, issue of the American Journal of Cardiology, reported the case history.

Read the study for yourself, "Exercise-Induced Hypertension, Endothelial Dysfunction, and Coronary
Researchers say this is the first case, to their knowledge, of advanced coronary calcification in an otherwise healthy middle-aged male marathon runner who lacked traditional cardiac risk factors and had no symptoms of heart disease, according to the University of Maryland media release.

According to the study's abstract, "Aerobic activity performed on a regular basis is 1 of several lifestyle recommendations endorsed to reduce risk of coronary disease. However, one potential concern of arduous aerobic activity is exercise-induced hypertension."

"This is the first case to our knowledge, of accelerated coronary calcification in an otherwise asymptomatic middle-aged male marathon runner devoid of traditional cardiovascular risk factors. As a consequence of exercise-induced hypertension and associated oxidative stress, improvement of endothelial dysfunction occurred after antioxidant supplementation. In conclusion, vigorous aerobic activity in susceptible individuals may promote oxidative stress and coronary atherosclerosis."

So would taking antioxidants help? According to the study's abstract, "The researchers conclude that the physician's intense, long-term exercise regime, coupled with a predisposition toward a type of hypertension, contributed to his cardiovascular disease.

"In this particular individual, we think that oxidative stress was an important contributor," says the study's senior author, Michael Miller, M.D., director of preventive cardiology at the University of Maryland Medical Center and associate professor of medicine at the University of Maryland School of Medicine. "But we also found that this individual has exercise-induced hypertension, which I think is vastly under-diagnosed."

Oxidative stress is a byproduct of the normal cellular metabolism of oxygen. It refers to cell, tissue or organ damage from a class of molecules associated with oxygen metabolism, including unstable molecules called "free radicals." Oxidative stress plays a role in many heart, lung, blood and sleep disorders, including atherosclerosis, or hardening of the arteries, hypertension, heart failure, asthma and sleep apnea.

To help gauge the impact of oxidative stress on the patient's cardiovascular system, his doctors evaluated the response to exercise of the endothelium, the lining of his arteries. An ultrasound device was used to measure what is known as flow-mediated vasodilation. It shows how well the endothelium responds to a sudden increase in the flow of blood through an artery in the upper arm. The endothelium in a healthy vessel typically dilates or expands during this test to accommodate the increased blood flow, while an impaired vessel constricts or narrows.
The patient's blood vessel dilation was normal before exercising. But after exercise, vessel constriction occurred immediately and showed no improvement after an hour. To put this response into perspective, the researchers administered the same exercise/blood vessel response test to a group of ten men whose mean age was 41. The vessels of these men initially constricted, but improved significantly one hour after exercise.

Several weeks later, the patient was given vitamins C and E just before exercise and was tested again for endothelial response. These vitamins are known as antioxidants and may protect cells from free radical damage. This time, the test revealed a partial reversal of the blood vessel constriction after one hour, and normalization after two hours.

If vitamin C and E showed a partial reversal, would drinking vegetable and fruit juices help also? How about pomegranate juice? The idea seems to be moving toward antioxidants beginning to reverse calcification. What else did the study reveal?

"As he took the vitamin C and vitamin E, you could see improvements in his brachial arteries," says Dr. Miller, according to the study. "We recommended that the patient take these vitamins before he runs."

With half the mystery solved, the research team explored another possible cause of the calcium buildup—elevated blood pressure. Hypertension can cause artery walls to thicken and the endothelium to narrow. This narrowing can promote the formation of fatty plaque deposits in artery walls. The plaque, from cholesterol and fats, can eventually harden or calcify.

Although hypertension did not seem to be a risk factor for this patient, exercise is a major factor in his life. So, the researchers turned to a treadmill stress test to measure his blood pressure during exercise.

At the start of the treadmill test, his baseline blood pressure was normal, 118/78 millimeters of mercury (mmHg). He was in such great shape that it took 20 minutes to reach high blood pressure levels, and this happened only after the treadmill speed and incline had been raised. But by the end of the test, his blood pressure had soared to 230/78 mmHg. A check of several of his previous treadmill tests indicated a similar rise in blood pressure.

On the basis of running duration and intensity, the researchers estimated that the patient spent about 30 minutes a day at a systolic blood pressure above 200 mmHg. This number is well into the blood pressure danger zone and meets one definition of exercise-induced hypertension—a jump of at least 60 mmHg from baseline after exercise.

This finding should be investigated further, says co-investigator Matthew R. Weir, M.D., head of nephrology at the University of Maryland Medical Center and professor of medicine and head of the division of nephrology at the University of Maryland School of Medicine.

“Because we know that blood pressure rises during a stress test, we tend not to pay attention to it. We’re more interested in changes in electrical activity and the redistribution of blood during exercise, which could indicate inadequate blood supply to the heart muscle,” says Dr. Weir, according to the press release. “The question is, should we pay more attention to treadmill-induced changes in blood pressure as a means to identify people at
risk for developing coronary artery disease?"

Dr. Miller adds another question, "Should we screen all middle-aged individuals who want to participate in an exercise program to make sure they don't have exercise-induced high blood pressure?" Unlike cholesterol or triglyceride levels, blood pressure levels fluctuate dramatically throughout the day, depending on a variety of factors such as exercise, emotions and even the time of day.

In light of that phenomenon, Dr. Weir says, according to the press release, that the study raises another issue. "This research indicates that we need a more dynamic measure of blood pressure to truly profile the risk of an individual. We've been using casual, at-rest office readings of blood pressure for more than 50 years. It's not bad, but it's not the answer."

The treadmill is one way to gather a more dynamic measurement, but he says there's an easier option. "It can even be done at home if you have a blood pressure cuff and someone who can take your blood pressure at peak exercise."

The patient in the study continues to run, but is now taking medications to lower both his cholesterol and blood pressure. Despite his exercise regime, he appears to be in the same boat as millions of Americans who do not exercise regularly.

So, is too much exercise a bad thing? The physicians answer to the contrary. "We are not publishing this report to suggest in any way that people should not be exercising. Exercise has stood the test of time as being one of the best ways to modify cardiovascular risk," says Dr. Miller. "But what we're looking at are improved detection methods for predicting those at risk. Exercise-induced high blood pressure may be a part of that."

Other authors of the study included Radha Goel, M.D., Duke University School of Medicine, Durham, North Carolina; Farhan Majeed, M.D., Robert Vogel, M.D. (http://www.allvoices.com/s/event-4493253/aHR0cDovL3d3dy51bW0uZWR1L2RvY3RvcmNvcm9iZXJ0X2Ffdm9nZWwuaHRt%20bA==), Charles Mangano, R.D.M.S., Charles White, M.D. (http://www.allvoices.com/s/event-4493253/aHR0cDovL3d3dy51bW0uZWR1L2RvY3RvcmNvY2hhcmxlc19zX3doaXRIILmh0%20bWw=), Gary D. Plotnick, M.D. (http://www.allvoices.com/s/event-4493253/aHR0cDovL3d3dy51bW0uZWR1L2RvY3RvcmNvZ2FyeV9kX3Bsb3RuaWNRlLmh0%20bWw=), University of Maryland School of Medicine and Mary C. Corretti, M.D., Johns Hopkins Hospital.

The moral of this study is find out whether you're inclined to exercise-induced hypertension that might be causing your arteries to fill up with calcium and other issues of rapid aging too soon. Before you start a running program, see what happens to your blood pressure as you exercise for an extended period of time or anytime, even including taking that walk each day for an hour.

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Nutrition, health, and media culture writer, Anne Hart is the author of more than 4,000 online articles, 91 paperback books, including numerous novels, and holds a graduate degree in English/creative writing. /a>