Should The Public Be Wary of Arginine Supplements? Think Again.

By Bill Sardi

The headline report at WebMD said *"Don't take L-arginine for Heart Attack."* I don't know of a person undergoing a heart attack who would think of reaching for arginine pills, let alone be able to swallow 9 grams of this amino acid while attempting to gasp for breath and deal with the crushing chest pain. But that's what the headline said. It sounds like somebody is attempting to scare the public away from arginine pills. I Wonder why?

Arginine has been marching towards greater acceptance for treatment of a variety of cardiovascular disorders in recent published studies. The Journal of Nutrition suggests human studies begin using arginine among adults with high blood pressure, since arginine is required to produce nitric oxide, a transient gas that dilates (widens) blood vessels and helps to control blood pressure. [Journal Nutrition 134: 2807-11S, 2004]

But the January 4 issue of the Journal of the American Medical Association (JAMA) put a halt to the enthusiasm for arginine with the announcement that supplementation resulted in the deaths of six patients versus none in an un-supplemented group. [The Journal of the American Medical Association, January 4, 295: 58-64, 2006]

Contrary reports

To the contrary, when researchers in Poland provided 3000 milligrams of arginine, 3 times a day for 30 days, to people following the onset of symptoms of a heart attack, 24% of patients given arginine experienced shock, pulmonary edema or a second heart attack, versus 27% in the untreated group. The researchers report that *"no serious adverse events were observed during arginine supplementation."* [Kardiology Poland 62: 421-27, 2005] Of course, this study wasn't heralded in news reports. Statistically it could be said the Polish doctors demonstrated a 13% reduction in adverse cardiac events following a heart attack.

Let's take a look at another recent study. When arginine is infused into patients with poor circulation during coronary artery bypass graft surgery, 18 of 20 patients had their cardiac rhythm return to normal spontaneously versus only 4 of 20 untreated patients who had to undergo electric shock (defibrillation) to get their heart rhythm to return again. [International Journal Cardiology 97: 93-100, 2004]

Before we go any further, readers need to understand how arginine works. The body must control the internal diameter of the arteries. Physical activity increases the demand for oxygen, increases the heart rate, and could raise blood pressure, but the blood vessels compensate by dilating (widening). The blood vessels cannot dilate properly without sufficient amount of arginine, an amino acid, which is required for production of a transient gas called nitric oxide. Nitroglycerine pills also generate nitric oxide to dilate blood vessels. [Cellular Molecular Biology 51: 307-20, 2005] Bottom line, arginine is essential for human health.

Confusion

So is arginine good or bad? Actually, patients with coronary artery disease who experience mortal outcomes are more likely to have high levels of an inhibitor of nitric oxide, dimethylarginine, which is a by-product of arginine. [Circulation Research 97: 53-59e, 2005]

But here's the confusing part. When animals that have been genetically engineered so that they don't produce nitric oxide and are subjected to a heart attack, they experience a better outcome. The provision of arginine worsens their condition. The decrease in the heart pumping action (ejection fraction) and increase and the enlarged size of the left ventricle of the heart are less severe after a heart attack in mice that cannot produce nitric oxide. In the post-heart attack period, a shortage of nitric oxide improves heart function. [American Journal Physiological Heart Circulation Physiology 289: H2616-23, 2005] But of course, this is an abnormal condition where the normal control of nitric oxide via arginine has been removed. So it doesn't apply to humans undergoing a heart attack. The body attempts to product just the right amount of nitric oxide, not too much, not too little, and more when needed.

A recent study shows that 9000 mg of arginine given to patients with coronary artery disease did not increase levels of nitric oxide bioavailability. [Circulation 101: 2160-64, 2000] This is because the body produces it upon demand, such as with increased heart rate, etc. A person can pour all the arginine they want down their throat, it will only produce more arginine if the person is deficient in this amino acid. Which is what the researchers retrospectively now surmise who wrote the Journal of the American Medical Association report. The patients in the JAMA study were sufficient in arginine.

The missing information

But there are some facts missing that the public needs to be aware of. The patients in the American Medical Association report were being given other medications, aspirin (which depletes folic acid and vitamin C), a beta blocker (which slows the heart rate), an ACE inhibitor (to control blood pressure via artery dilation), and a statin cholesterol-lowering drug that

depletes the body of coenzyme Q10, an antioxidant needed for heart muscle energy. It's no wonder arginine had no effect upon the ejection fraction (the measure of blood pumped out of the ventricles of the heart). The patient's were on three drugs that impair heart function!

The production of nitric oxide is countered and controlled by dimethylarginine. [Hepatology 42: 1255-57, 2005] Researchers in Korea found higher levels of dimethylarginine after heart attacks, is associated with cardiac risks. They also attempted to measure whether dimethylarginine, a by-product or arginine, which inhibits the overproduction of arginine, is influenced by medications (like the one's used in the JAMA study), but the numbers of patients taking various medications were too small to develop any conclusions. [American Journal Cardiology 95: 729-33, 2005]

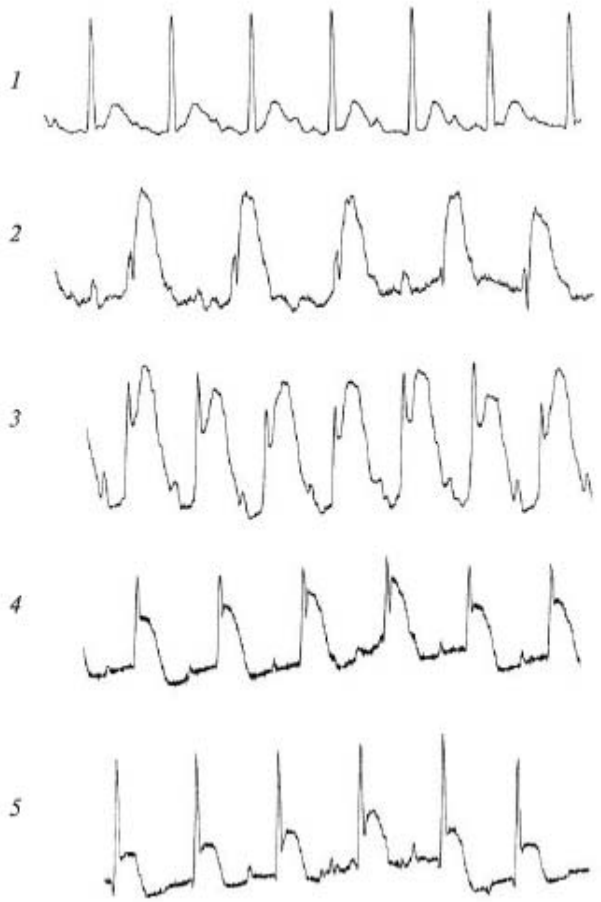
Proper conclusion

The conclusion of the study published in the Journal of the American Medical Association should have been, if a person has experienced a heart attack, and they are on all the deleterious standard medications which are not essential for human health, and which deplete the body of nutrients essential for cardiovascular health, then maybe they shouldn't take arginine, because there may be some kind of incompatibility. However, it would have been nice to see what arginine could have done all by itself, without the drugs to interfere.

Arginine in Russian experiment

Before the public is frightened away from arginine, let's go to Russia, where researchers used arginine in an animal experiment.

Russian doctors experimentally induced heart attacks in animals. When a heart attack was induced and arginine was administered, cardiac output, blood pressure and heart rate were stabilized and 80% of the animals survived in the arginine group versus 33% in the non-arginine group. [Bulletin Experimental Biology Medicine 139: 384-87, 2005]



Shown at left are five electrocardiograms performed on these animals. #1 is the cardiogram prior to the study. #2 is the cardiogram for animals that weren't given arginine 1-minute after a heart attack was induced. #3 is a cardiogram is a cardiogram where the production of nitric oxide, the blood-vessel dilating agent produced by arginine, was blocked. #4 and #5 are the cardiograms in the arginine-supplemented animals 5 and 20 minutes after the induced heart attacks. You don't have to be a trained cardiologist to recognize the beneficial impact arginine had on the cardiograms of these animals.

Arginine in France

So, finally, researchers in France were looking for an agent that would augment and enhance nitric oxide production when taking statin cholesterol-lowering drugs. Researchers in Paris demonstrated in animals that the combination of arginine with a statin cholesterol-lowering drug significantly *"hinders the spread of arterial plaques"* over the use of statin drugs alone and *"opens a new era of therapeutic strategy."* [Annals Biol Clin 63:443-55, 2005]

It seems these days, any time a nutrient or herbal agent appears it could replace more expensive and problematic drugs, a news headline soon appears slamming the nutrient or herb. I'm wondering if the public is becoming suspicious of these news reports and the pseudo-science that is behind them?

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