

## Runners -- Let thirst be your guide

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Many people are drinking too much water, including sports drinks, when exercising, a practice that could put some individuals engaging in prolonged types of endurance exercise at risk of potentially lethal water intoxication, say international experts who study disorders of water metabolism. Such exercise includes marathons, triathlons, and long distance cycling.

This serious condition, known as exercise-induced hyponatremia (EAH), could be prevented if only people would respect their personal thirst “meter,” or would undertake a “sweat test” to determine how much water they actually need to drink in order to replace just the body fluids lost during exercising, the researchers say.

A group of experts in this condition has issued a number of papers and recommendations, including an international consensus statement on this disorder published in the *Clinical Journal of Sports Medicine* in 2005. Joseph Verbalis, M.D., Professor and Interim Chair of the Department of Medicine at Georgetown University Medical Center and a member of this group, recently updated the scientific community on the causes of this disorder in the May issue of *Sports Medicine*.

Verbalis says the goal of the group is to understand the biological basis of EAH, and in that way, assure that no athlete ever succumbs to it again. A number of marathon runners have died from EAH, including one at this year’s London Marathon in April. One recent study found that 13 percent of Boston marathon runners suffered from EAH, though most cases are mild enough so that they are not noticed by the athletes

themselves.

“The tragic aspect of the deaths that have occurred from EAH is that these are healthy young people who otherwise would have lived normal, long lives,” says Verbalis, who is also Chief of the Division of Endocrinology and Metabolism at Georgetown.

“The data clearly indicate that EAH is caused by excess drinking during endurance exercise activities, and that it can be prevented by limiting fluid intake while exercising, he says. But despite this knowledge, Verbalis points out that “unfortunately, we are not seeing this condition go away.”

“The public’s impression of the amount of water that is necessary to drink for good health is not based on real factual data,” he says. “Many in our society have promoted the idea that you need to continually drink a large amount of fluid, such as 8 ounces of water eight times a day. But most people don’t really need that much.”

Verbalis points out that EAH predominantly afflicts exercisers engaging in endurance activities of 4 hours in duration or longer. But “the average person who goes out for an hour or two of strenuous exercise is not going to be at risk for this,” he adds.

Verbalis also says that sports drinks, which contain some sodium and potassium and carbohydrates, are basically water with a few additives. “There’s a misconception among the sports community that consuming sports drinks rather than water will protect you from becoming hyponatremic. That’s simply not true,” he says. “Drinking too much of anything puts some people at risk for potentially dangerous levels of hyponatremia.”

The disorder occurs when endurance exercisers drink more fluid than

their kidneys can excrete. The hormone that determines how much fluid a kidney can excrete is arginine vasopressin (AVP), which is released from the pituitary gland when a person is becoming dehydrated in order to force the kidneys to conserve water. At rest, a person's AVP level is low and can be suppressed to zero when sufficient fluids are ingested so that the kidney can excrete, rather than retain, excess water. But AVP levels can rise in people who exercise strenuously over a number of hours, even if they are not dehydrated.

“A kidney can normally excrete up to a liter an hour with an AVP level of zero, but when you're exercising, the AVP is telling your kidney to excrete a volume of fluid that is markedly less than the maximum the kidney can excrete at rest,” Verbalis says. Too much water intake in an endurance exerciser whose AVP levels are on the rise means that some of the ingested water will be retained, and that excess water can dangerously dilute the level of sodium in the blood that is needed for organs to function, he adds.

Investigators have been researching the triggers that stimulate AVP secretion during exercise, and have found several. One is a loss of fluid from the body and blood as a result of sweating during prolonged exercise. Another is nausea, a common reaction to extreme sports, which makes the body think vomiting will ensue, so water needs to be conserved, Verbalis says. Finally, a research team that included Verbalis recently reported in the *American Journal of Medicine* that release from muscles of a cytokine known as interleukin-6 (Il-6) is also capable of stimulating AVP secretion.

Verbalis noted in his *Sports Medicine* paper that since 1985, “well over 100 individual cases” of EAH have been reported from physical exercise activities as diverse as forced military marches, prolonged hiking and marathon, ultramarathon and triathlon races, and there have been at least 8 documented fatalities. Some people have been known to gain up to 6-7

pounds during a marathon due to retention of water that the kidneys cannot excrete, he says. “No one should be gaining any weight during these events,” according to Verbalis, “and if they do, it can only be due to fluid retention.”

The hyponatremia consensus panel has recommended that everyone, including endurance exercisers, should “drink to thirst” — that is, drink only when you feel you need to. Verbalis acknowledges that this advice is controversial, because some trainers and sports physiologists contend that “by the time you’re actually thirsty, you have lost enough fluid to already be dehydrated, so they say you need to drink in anticipation of becoming dehydrated.

“We dispute that notion, and contend that thirst is a good indicator of your body’s need for fluids, and that there is a window of time over which you can rehydrate safely,” he says. While a person “needs to lose about 1-2 percent of body water before thirst will reliably remind you to drink, losing that little is not sufficient to cause any significant health problems,” Verbalis says. “Many of us are often dehydrated to such small degrees, and it does not significantly affect us.”

But he adds that endurance exercisers who don’t want to rely on their body’s thirst meter have another excellent option, and that is undertaking a sweat test. This involves recording a person’s weight digitally, then running on a treadmill for an hour and recording their ending weight after toweling off the body sweat. “Most people don’t know how much they really sweat while exercising, but this simple test can tell you approximately how much fluid losses you are generating from sweat,” he says. “There is no need to drink significantly more than that, because sweat represents the major source of fluid loss during exercise.”

A healthy person needs to be dehydrated in the range of 4-6 percent loss of body water before there’s a significant health risk problem from

dehydration, Verbalis says. “So, really, if people just do things in moderation, especially including re-hydrating by drinking, they’re not going to be at risk of either dehydration from excessive sweat losses or EAH from excessive fluid ingestion.”

Source: Georgetown University Medical Center

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