Exercise Associated Hyponatremia

For years all of us have heard, "Drink before the race," "Drink during the race," "Drink after the race," "Drink as much as you can," "Pre-hydrate," "Hydrate," "Don't forget to drink," "Stop at every water/aid station." Well the notion of drinking as much as you can during endurance racing has changed over the past couple years as the medical and racing community learn more about Exercise Associated Hyponatremia (EAH.) This is defined as a serum (blood) concentration of less than 135 mmol/L (normal 135-145.) Always remember that water follows sodium and if a runner drinks too much water or hypotonic solution during an endurance event, he or she is at risk for developing EAH from over-diluting one's blood sodium with water. Symptoms do not typically develop until serum sodium falls below 130 mmol/L, but the absolute level of serum sodium does not correlate well with the severity of EAH.

Runners may wonder why they see fewer water stations than they have in the past. This is because the medical and racing communities are working to prevent overhydration and possible development of EAH. Both water and commercial sports drinks (ie. Gatorade and Powerade) can contribute to EAH. Commercial sports drinks are still hypotonic, which means that they still have a lower serum sodium concentration than our bodies' own blood. So overhydrating with any substance that is hypotonic, such as water or commercial sports drinks, can contribute to hyponatremia.

Every runner is different and thus every runner needs to approach fluid replacement differently. Risk factors that have been associated with EAH are: low body weight, female sex, greater than 4 hours of exercise duration, slow running or performance pace, race inexperience, excessive drinking behavior, high availability of drinking fluids, abnormal kidney function, and extreme hot or cold conditions.

Current recommendations are to simply drink when thirsty. A runner should approach hydration status with the following ideas in mind. Start a race after being properly hydrated. One can asses this by urine color. Totally clear urine may be a sign of overhydration and very dark yellow urine may be a sign of dehydration. One should aim for a very light yellow urine color before the race. Another important concept to understand is "sweat rate." Sweat rate is an individual measure of fluid loss during exercise. One should weigh themselves naked before a long run and run in similar situations to what you anticipate to experience in the race. After one hour of running, one should towel dry and then weigh themselves again, naked. Determine the amount of weight loss during this one hour. So for example, if a runner weighs 150 lbs before a one hour run and returns to weigh 149 lbs, he or she had lost 1 lb per hour. This equals 16 ounces of water. So this individual's sweat rate would be 16 ounces per hour and should attempt to replace that amount over one hour of running. This is simply an example but it will allow you to estimate your own sweat rate and thus fluid requirements during a race. Individuals who gain weight during the race, may have ingested too much fluid and thus overdiluted their serum sodium and are now at risk for Exercise Associated Hyponatremia.

Symptoms of Exercise Associated Hyponatremia are confusion, bloating, puffiness, nausea, vomiting and headache. These symptoms are somewhat non-specific and are also similar to those symptoms associated with dehydration. Unfortunately the treatment for each of these conditions is completely the opposite. Giving IV fluids to an individual with EAH may actually worsen the hyponatremia and causes death. It is important to seek the medical care of a qualified individual who can accurately assess the situation and treat each runner individually and appropriately.
Runners can help the medical team by writing their pre-race weight on the back of their bib number. The medical team can weigh you after the race and this will assist us on our medical decision making and potential treatment.

For more information on this topic and calculating one's sweat rate please visit the USA Track and Field website at http://www.usatf.org/news/showRelease.asp?article=/news/releases/2003-04-19-2.xml . Once again, please email me with any questions that you may have.

Good Luck,
Bryant