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CONTACT: Christopher Land
Office: 214/688-3403
Home : 214/351-5624

Sometimes too hot the eye of heaven shines.

Shakespeare

The sun will shine too hot for many of us this summer. A few even will die from it.

Death from heatstroke (also known as sunstroke) is much more common than statistics show, says Dr. James P. Knochel, professor of internal medicine at The University of Texas Southwestern Medical School at Dallas and a well-known expert on heat injuries.

"These deaths usually are ascribed to something other than heatstroke," Dr. Knochel says, "because heatstroke is preventable and acknowledgement of its occurrence is embarrassing."

As an example he cites the case of a Houston high school athlete who died of heatstroke in 1975. It was extremely hot and humid when the 15-year-old reported for the first day of football practice late that summer.

"He collapsed and was taken to a community hospital where by the time they figured out what was wrong with him he was three-fourths cooked," Dr. Knochel says. (The body temperature of a heatstroke victim may rise to the point that tissues and organs literally are cooked.)

"The cause of death was reported as liver and kidney failure--not heatstroke," he continues. "I think we have cases like this every year, but we usually don't hear about them except through the grapevine."

This kind of heatstroke, termed "exertional" heatstroke, is caused by heat generated during muscle activity, in other words, during exercise or work. The heat accumulates faster than the body can dissipate it. Exertional heatstroke can affect any person who overexerts himself.

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The other type, "classic" heatstroke, occurs with or without exertion and is usually caused by an inability of the circulatory system to respond to heat stress. The result is that not enough sweat is produced to cool the body.

The heart is the key to a person's ability to cope with heat, Dr. Knochel explains. "It must increase its output in order to pump the hot blood to the skin surface where the heat is then dissipated by sweating."

If the heart is not able to respond properly or if the blood volume is low, as in dehydration, then the sweat mechanism will fail and the body temperature will rise.

A number of conditions make an individual more susceptible to heatstroke, including heart disease, obesity, the use of certain drugs, and alcoholism and diabetes (both of which can result in dehydration and malnutrition).

"A lot of the heatstroke patients we see in Dallas are fat people who are not accustomed to the heat," Dr. Knochel says. "Some of them take diuretics (drugs which decrease body fluids) to lose weight, which really makes it dangerous for them to work in the heat because their blood volume is inadequate."

When someone has a heatstroke, they are in a coma: that is, they are unresponsive to any external stimulation. Sweating usually ceases, so their skin is dry, extremely hot to touch, and flushed.

(In contrast, those suffering from a less serious heat illness, heat exhaustion, will be sweating and may still be conscious. Usually they feel weak and just need water and rest.)

The body temperature of heatstroke victims usually exceeds 106 degrees. "If their temperature reaches 108 degrees the heat starts altering proteins, which are what the whole body is made of. What happens is every tissue and organ--including the brain--gets cooked. At that temperature you are likely to have permanent brain damage."

Untreated, heatstroke is always fatal, he adds.

First aid for heatstroke victims aims to lower the body temperature as quickly as possible. "Your first inclination might be to call an ambulance," Dr. Knochel says, "But the victim could die before the ambulance gets there."

Instead, the first thing to do is get the victim out of the sun, remove his clothes, and then douse him with water. Use a piece of his clothing, or whatever is available, to fan him.

The goal is to imitate the sweat mechanism, he explains. "If you lick the back of your hand and blow on it, your skin immediately will feel cooler. The sweat mechanism is based on the same principle: as sweat evaporates from the skin it cools the body.

"Using this technique as first aid, you might have the heatstroke victim half-cooled by the time the ambulance arrives."

During hot and humid weather ambulances and hospital emergency rooms should be stocked with plenty of ice. Ice massages and ice baths are used by trained personnel to further lower the victim's body temperature. "The important thing is to be prepared so that when heatstroke patients are brought in, they are diagnosed and treated promptly," the Dallas physician says.

Humidity is an important factor leading to heatstroke because if the air is saturated, sweat will not evaporate. Sweat that is rolling off and dripping is not effective in cooling the body, so the person feels hot and uncomfortable.

Clothing is another contributing factor. If the body is all covered up in heavy clothing, sweat cannot evaporate.

Dr. Knochel recommends that unless you are fully acclimated, you should not do anything strenuous during the middle of the day when the temperature is above 90 degrees and the humidity is above 40 percent. On such days, exercise should be done in the early morning and late evening, when the sun and heat are less intense.

Also, drink plenty of water--before, during and after exercising, he says. "We now know that you can increase your performance by about 20 percent if you load up with water before exercising."

Dehydration causes a major share of the deaths that occur in young athletes, he points out. "Not only should coaches provide the kids with water, but they should make sure that they drink it. You wouldn't drive your car very far without water in the radiator, would you?"

Dehydration can cause the salt concentration in the blood to go extremely high "...and the excess salt draws water out of the brain, turning it into a prune."

For this reason, the practice of taking salt tablets before exercising is highly dangerous. "If you take salt without drinking a lot of water, there is no way your kidneys can get rid of the excess. The result may be dehydration and brain damage."

Salt and the other essential nutrients lost in sweat should be taken during meals as part of a balanced diet, he adds.

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