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The full report is titled “Mechanism of Cocaine-Induced Hyperthermia in Humans.” It is in the 4 June 2002 issue of *Annals of Internal Medicine* (volume 136, pages 785-791). The authors are CG Crandall, W Vongpatanasin, and RG Victor.

Body Heat Management in People Using Cocaine

What is the problem and what is known about it so far?

Cocaine abuse can kill people by increasing body temperature to fatal levels. In the past, doctors have assumed that increased body temperature was caused by the agitation and increased muscular activity that often accompany cocaine use. There are at least two ways the body gets rid of excess heat: behavioral methods (such as avoidance of hot rooms) and physiologic methods (such as sweating and increasing blood flow through vessels near the surface of the skin, as can be seen in the rosy cheeks of a running child). Since cocaine-associated deaths occur much more frequently in hot weather than in cold, some researchers have suggested that part of the problem may be related to difficulty in getting rid of excess body heat rather than producing too much heat.

Why did the researchers do this particular study?

To find out how cocaine affects body temperature adjustments in humans.

Who was studied?

7 healthy volunteers who had never used cocaine.

How was the study done?

Volunteers wore body-covering suits made up of hollow tubes. Hot water was circulated through the tubes to heat the surface of the skin, thereby increasing body temperature. Volunteers swallowed a tiny thermometer so that the temperature inside the body could be measured accurately. The suits did not cover the volunteers' heads, arms, and feet, and researchers measured sweating and blood flow through the skin by using volunteers' forearms. Volunteers were asked about their level of discomfort when body temperature increased. For each volunteer, a low dose of cocaine or a nonnarcotic local anesthetic (lidocaine) dissolved in saline solution was applied to the inside of the nose. Each of the solutions was given in separate trials, but neither the volunteers nor the doctor knew which substance was being given or in what order.

What did the researchers find?

When heat was applied to the skin, temperature inside the body increased more when cocaine was given than it did when lidocaine was given. However, sweating and blood flow through the skin did not increase as much with cocaine as with lidocaine. Skin heating did not produce as much discomfort when cocaine was given as it did when lidocaine was given.

What were the limitations of the study?

Habitual users of cocaine might react differently than the volunteers in this study, who had never used cocaine before.

What are the implications of the study?

Cocaine use, even at low doses, causes increased heat production, decreased ability to sense excessive heat, and decreased ability to cool down. This can be fatal in circumstances in which illicit cocaine use is common (such as “rave parties”).

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