

# Heat Stroke Diagnosis Being Missed in Elderly Patients

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SNOWMASS, COLO. — Exertional heat stroke in young athletes garners all the headlines, but most heat stroke cases occur in elderly housebound individuals with underlying chronic disease, Eric Johnson, M.D., said at the annual meeting of the Wilderness Medical Society.

The fatality rate of heat stroke in the elderly is high. The diagnosis is often missed during the critical first hours. That's because the differential diagnosis in the elderly nonathlete is lengthy, unlike in a young sports participant who collapses during an intensive hot weather workout.

"A lot of the time with geriatric patients we find that doctors immediately order CT scans, ECGs, blood tests, and so forth—and only 2 hours later someone finally

takes a rectal temperature and finds out the patient has been 105° F. Then it's 'uh oh, this isn't meningitis, it wasn't a stroke, they're not septic, it wasn't a seizure,'" said Dr. Johnson, an emergency department physician in Boise, Idaho, and president-elect of the society.

"You have to think about those differential diagnoses, but the duration and magnitude of hyperthermia is the main determinant of outcome in heat stroke. When we miss it for 2 hours we have a very, very high mortality," he said.

The diagnostic work-up often can be accelerated by speaking with paramedics to learn what the patient's environment was like. If it was stifling, Dr. Johnson thinks heat stroke; if the air conditioning was on and the room was comfortable, he may lean more toward other possibilities.

Part of the problem in diagnosing classic heat



stroke promptly in the elderly is that it can be a challenge to obtain a reliable temperature reading from a patient with heat stroke. Measurements at the ear and rectum are "totally worthless" because they correlate poorly with core temperature in this situation, the physician said.

Instead, he obtains a bladder temperature if a Foley catheter is in place, or runs an esophageal probe to get a posterior retrocardiac temperature reading. Often he'll get both.

The concept of heat stroke lately has been redefined. Heat stroke is not primarily a dehydration issue; that's just one component. Heat stroke is a systemic inflammatory response to hyperthermia leading to a syndrome of multiorgan dysfunction in which encephalopathy is prominent.

**Most heat strokes occur in elderly housebound patients with chronic disease, not athletes.**

DR. JOHNSON

Patients typically arrive at the hospital with agitation, combativeness, or other mental status changes, a temperature above 104° F, tachycardia, and tachypnea. Often they are bleeding due to disseminated intravascular coagulation because antithrombotic factors have stopped functioning at high body temperatures.

"There are a lot of complications. These folks that come in with heat stroke are going to spend a substantial time in your ICUs," he continued.

A question that comes up all the time is how much intravenous fluid to give for resuscitation. Dr. Johnson noted that U.S. military medicine guidelines call for just 1-1.5 L, rather than the 3-4 L or more often still given in the civilian world. Israeli and Saudi physicians, whom Dr. Johnson considers the world's top experts in the management of heat stroke, also routinely use 1-1.5 L and have great success with it.

In his own practice he uses normal saline because of a theoretic concern that lactate may not be metabolized in the liver. ■

## Saudi-Style Misting Cools Heat Stroke Patients Fast

SNOWMASS, COLO. — The top priority following diagnosis of heat stroke is to start rapid cooling of core body temperature—and American physicians have much to learn from their Saudi Arabian colleagues in this regard, Eric Johnson, M.D., said at the annual meeting of the Wilderness Medical Society.

Saudi physicians are arguably the world's most expert at treating heat stroke. After all, they get the most practice. Every year they manage vast numbers of patients felled by heat stroke on the pilgrimage to Mecca.

The Saudis do so in enormous field tents equipped with huge fans. Heat stroke victims are brought to the tents and suspended on netting stretchers while the fans blow a fine mist of 32° C water on them.

"They do an incredible job cooling these patients," said Dr. Johnson, an emergency department physician in Boise, Idaho, and president-elect of the society.

In fact, he has been so impressed with the Saudi evaporative cooling technique that he has adopted it in the emergency departments in which he works.

Dr. Johnson calls it the Mecca body cooling unit. It consists of a stretcher made of netting, a big fan, and a mister spraying body-temperature water. Alternatively, a naked patient can be sponged with lukewarm water while being fanned with room air.

The ice-bath immersion method provides faster cooling than Saudi-style evaporative cooling, but Dr. Johnson and his colleagues find it unmanageable in elderly heat stroke patients.

"From our point of view the immersion method is really difficult. It's fine in a young healthy person, but if you get a combative elderly person with heat stroke and you try to put them in the tank with all the leads and monitors and intravenous lines you need, good luck. We don't use that in our system," he said.

Another cooling method is peritoneal lavage using lavage fluid at 6° C. This also achieves rapid cooling, but it is technically difficult in the elderly, who comprise the great majority of heat stroke victims.

"Most of these folks are going to be in critical condition and have disseminated intravascular coagulation, so peritoneal lavage becomes a real nightmare. We can control them fairly nicely by the mist method if their heat stroke is recognized early enough. The literature supports that," Dr. Johnson said.

He routinely gives diazepam to prevent shivering while cooling. Alternatively, low-dose meperidine (Demerol) can be used. "Don't let these patients shiver. They'll generate a tremendous amount of heat. They'll beat you at your own game." ■

# Hypnotic Agents May Protect Against Falls in Frail Elderly

DENVER — The conventional wisdom holding that prescribing hypnotic agents for nursing home patients increases their risk of falling and hip fracture may not be correct.

A recent study involving more than 34,000 Michigan nursing home residents suggests an alternative explanation: The increased risk of falls may be attributable to the insomnia for which hypnotic agents are so often prescribed, rather than to the drugs themselves. W. Vaughn McCall, M.D., said at a satellite symposium held in conjunction with the annual meeting of the Associated Professional Sleep Societies.

He cited an analysis of a Michigan Medicare database by Alon Y. Avidan, M.D., and colleagues at the University of Michigan and the Veterans Affairs Medical Center in Ann Arbor. They examined

the risk of falls and hip fracture over 6 months of follow-up in 34,163 elderly residents in 437 Michigan nursing homes.

During follow-up, 42.9% of patients fell and 2.5% sustained a hip fracture. After adjusting for numerous potential confounders in a multiple logistic regression analysis, including age, gender, functional status, illness burden, number of medications being taken, cognitive status, and intensity of resource

utilization, the investigators concluded that insomnia—but not hypnotic use per se—was predictive of future falls, noted Dr. McCall, professor and chairman of the department of psychiatry and behavioral medicine at Wake Forest University, Winston-Salem, N.C.

Dr. Avidan and colleagues went on to speculate that the use of hypnotics to treat insomnia in the frail elderly might actually protect against falls. Dr. McCall called that "a very provocative state-



**The increased risk of falls may be due to insomnia itself rather than the drugs used to treat it.**

DR. MCCALL

ment." And while he is intrigued by the Michigan findings, it will take more than a single observational study to convince him.

"I'm not ready to state this as the final word on the subject. I'm personally not prepared to go that far, even though this is a large study of debilitated nursing

home patients. But I do think the study opens the door to looking at this issue more carefully," he said at the symposium, sponsored by Sepracor.

In the Michigan study, supported by the National Institute on Aging, the 259 insomniac nursing home residents on a hypnotic agent had an adjusted 32% greater risk of falls than did the 31,391 who did not have insomnia and were not on a hypnotic. Particularly noteworthy was the finding that the 1,890 individuals with insomnia who were not taking a hypnotic agent had a 55% greater risk of falls.

Among the nursing home population who did not have insomnia, the 632 on a hypnotic agent did not have a significantly greater risk of falling than did those who were not on this class of medication (J. Am. Geriatr. Soc. 2005;53:955-62).

Regardless of whether a randomized trial ever actually demonstrates that hypnotics do not increase and perhaps even do protect against falling in the frail elderly, Dr. McCall noted that there is no doubt that sleep problems are more common in the elderly than in any other age group, and that those sleep difficulties produce next-day impairments in cognitive ability that can be easily confused with dementia.

This underscores the importance of appropriately assessing and treating elderly patients with sleep problems using the behavioral therapies and/or medications, particularly the newer short-acting nonbenzodiazepines—zolpidem (Ambien), zaleplon (Sonata), and eszopiclone (Lunesta)—with demonstrated efficacy in this setting, he said. ■