Prehospital Management and Transportation of Elderly Hypothermia Victims
Incidence

Data from the National Center for Health Statistics demonstrates that over 30,000 excess deaths are caused by cold stress in the United States each winter. This conservative figure is based upon analysis of excess winter mortality during the first quarter of the calendar year, and therefore does not include excess deaths in November and December. The 30,000 excess deaths are also exclusive of influenza mortality, which in recent years has contributed an additional 15,000 to 55,000 deaths to the total excess mortality, raising the first quarter figure as high as 85,000.

Cold stress is the direct cause of hypothermia, a critical national health problem which threatens the lives of millions of older Americans. The National Institute on Aging estimates that over 2.5 million older Americans are especially at risk, and experts in the medical community estimate that tens of thousands of elderly people die of hypothermia in their own homes each year.

Official mortality rates underestimate the number of deaths directly and indirectly caused by hypothermia, because the condition is often difficult or impossible to diagnose, especially when a body is discovered some time after death. In such circumstances, the official cause of death that is recorded on the death certificate will be a known medical condition like heart or lung disease rather than exposure to cold.

Identification

Hypothermia is a complex, frequently fatal medical condition characterized by a deep body temperature below 95°F (35°C). The condition is often overlooked or mistaken for another disease common in old age. The only sure way of detecting the condition is with a low reading thermometer. The issue of thermometry in detecting and monitoring hypothermia deserves special attention for several reasons. In a cold environment, a rectal temperature is preferred for hypothermia assessment because cold surroundings can compromise the accuracy of an oral reading. This problem does not apply to indoor temperature assessments when surroundings are not cold. Accurate oral hypothermia readings can be obtained in temperate indoor environments. Standard glass clinical ther-
mometers do not register below 94°F, and the usual shakedown point is between 96° and 97°F. Many EMTs and many hospital emergency rooms are not equipped with either low reading glass clinical thermometers or electronic thermometers that register temperatures below 94°F. The potential for fatal misdiagnosis and mismanagement is obvious under these circumstances as both the initial diagnosis and subsequent proper hospital management depend upon accurate primary diagnosis and continuous monitoring of the victim’s deep body temperature during rewarming.

The EMT attempting initial diagnosis in the field faces a complex problem. Hypothermia causes disorientation, and in the early stages the only obvious sign may be a growing confusion on the part of the elderly victim, as mental acuity declines with body temperature. Obtaining a rectal temperature in a cold environment from a confused and disoriented adult can be difficult, and the prudent EMT may elect to review a mental checklist of hypothermia signs in lieu of attempting to obtain a rectal temperature at this stage.

**Signs of Hypothermia**

Signs should be sought both from primary observations and from friends and relatives. Look for changes in appearance and behavior. Hypothermia often develops over a period of several days in elderly victims, and friends and relatives can often provide this important information.

**Appearance**

1) **Skin:** The skin is cool or cold. Pay special attention to the stomach, lower back, arms, legs, hands and feet. The skin color is very pale, but it may also have large, irregular blue or pink spots. Discoloration at pressure points is common. The face is frequently “puffy” or swollen, and this change is often readily obtainable from relatives or friends, who might not otherwise volunteer the information.

2) **Muscles:** The muscles are often unusually stiff, particularly in the neck, arms and legs. This stiffness may be accompanied by a fine trembling, perhaps limited to one side of the body or one arm or leg.
While shivering is a cardinal sign that the body is having trouble keeping warm, this physiologic response is frequently diminished or absent in older adults.

Coordination is frequently impaired and victims risk injury from falls if they are permitted to move about.

3) **Vital Signs**: Heart rate, respiratory rate, cough reflex, and the activity of the gastrointestinal tract are all depressed by cold.

Heart rate: The heart is bradycardic and demonstrates an increased potential for sudden ventricular fibrillation or cardiac standstill at lower temperature levels. Individual thresholds vary, and extreme care should consequently be taken in handling elderly victims.

Pulse assessment is often difficult without the use of monitoring equipment and extra time should be taken if pulses are the only means of determining cardiac status. If electrocardiographic documentation is available, EMTs should be alert to the possible presence of a J (Junctional) wave. This is best described as a positive deflection in the left ventricle leads, at the juction of the QRS and ST segment. Approximately one third of hypothermia victims are reported as showing this J wave, and it is considered diagnostic of hypothermia. Most hypothermic patients are also reported to have a fine oscillation of the base line due to the muscular rigidity provoked by hypothermia.

Respiratory rate: Respiration is depressed at lower temperatures and depression of the cough reflex increases the potential for aspiration. Passive precautions against aspiration of vomitus are advisable, especially in view of gastric dilatation, which is common in hypothermia. At the same time, however, the use of esophageal and endotracheal adjuncts should be approached with extreme caution because of the reported potential stimulation of ventricular ectopic beats and possible ventricular fibrillation.

*Diagnostic Caution* The EMT should always bear in mind that profound hypothermia mimics death. Many hypothermia
victims have been assumed to be dead, when in fact they were still alive. Blood pressure, pulse, and respiration may be unrecordable. Muscular stiffness is easily mistaken for rigor mortis. Pupils may be dilated and unreactive. The victim may appear to be quite dead.

It is certainly worth repeating that temperatures do not have to fall below freezing for hypothermia to occur. Many factors predispose the elderly to this condition, not the least of which happens to be the use of a wide range of prescription medications such as antidepressants, sedatives, tranquilizers, and cardiovascular preparations. Alcohol, while not a prescription drug, is often a predisposing factor. It is essential that the EMT be especially alert to the possibility of hypothermia in the elderly, even in circumstances that would seem innocuous. The victim with a temperature of 85°F is far easier to overlook when found in a 60°F room rather than in a 15°F snow covered alley.

Transportation

It is important to bear in mind that the sensorium depression produced by hypothermia, and the numbness which results from cooling of the skin and superficial musculature may mask pain and swelling, and cause injuries such as fractures to be overlooked. Victims must be handled and transported with great care, as the cold heart is very vulnerable to ventricular fibrillation.

Stabilization of the hypothermia victim prior to transport requires that the exposure to cold be terminated. This aspect may be critical to life support in very cold environments when transportation to a medical facility is delayed. Sheets, blankets, and foam pads can all be used to good advantage. Wet clothing speeds the loss of body heat over 25 times faster than dry clothing, and one remedy is to simply cut away the wet clothes using bandage shears. This is quick and effective and minimizes movement of the victim. An alternative is to cover the victim with a plastic sheet, and to insulate the sheet with blankets. The plastic stops evaporation, and acts as a vapor barrier system of insulation when covered with blankets.

It is essential to remember that the role of the EMT is to stabilize the elderly hypothermia victim and
transport gently to the nearest medical facility. Rewarming should not be attempted in the field without the express consent and supervision of a physician. The rewarming process is at best a hazardous undertaking for the elderly, and EMTs should bear in mind that the mortality for elderly victims averages 50%. The victim is best kept cool and stable until hospital rewarming can be accomplished.

NOTE: Should the heart fail during transport, CPR should be initiated and continue throughout the transport and hospital management process. The cold myocardium will not convert to sinus rhythm until sufficient rewarming has taken place. On a positive note, hypothermia reduces oxygen demand and confers a positive advantage to the CPR team.

For additional information contact: Center for Environmental Physiology, 1511 K Street, N.W., Suite 1100, Washington, DC 20005, (202) 737-3795

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