I Never Even Felt COLD

by Thomas Gross, M.D.

My Friends were huddling out of the freezing rain in a temporary shelter, brewing some tea. Oblivious to the icy downpour, I sat on a snow-covered log and pulled off my boots. I set them in a snowbank at my feet, and in a rainsquall high in the mountains I methodically proceeded to wring the water from my socks for several minutes.

I had lost touch with my situation, and if I had been alone, I might never have left those mountains. I was affected by hypothermia – a little recognized sometimes fatal consequence of prolonged exposure to winter conditions.

The weather had been clear and cold that morning when we left our base camp below the timberline in our third attempt to reach the summit. Due to the arrival of another snowstorm, we terminated the climb at 9,000 feet, put on our skis an headed back to camp. At a lower elevation, the snow turned to freezing rain.

I was not as capable a skier as my companions, and, as the packed snow turned to ice, I fell often, becoming wetter each time. I remember being angry and impatient with myself and with the others. I remember feeling clumsy. I don't remember feeling cold.

When we arrived back at our base camp, I removed all my wet clothes and donned some warm long johns. I then sipped hot soup and sat in front of the open door of a potbelly stove. After about an hour, I began to shiver. How low had my temperature dropped? (We estimated into the eighties) I shivered there in front of the stove for seven more hours, until finally I was able to get up and walk about without falling over. I was fortunate. I was a victim of hypothermia, which can be fatal. Hypothermia is a lowering of the body's core temperature to the point at which vital organs become affected.

We doctors divide discussion of hypothermia into groups according to cause, principally immersion vs. exposure. Immersion hypothermia is an extremely rapid and precipitous drop in body core temperature subsequent, usually, to immersion in cold water. Figure 1 shows, however, that severe hypothermia can result from immersion even in relatively warm waters.

While the bone chilling consequences of immersion in cold water are obvious, the onset of exposure hypothermia, where wind chill and air temperature combine to create hazardous conditions, is harder to recognize (see Figure 1). The onset can be either rapid or very slow and insidious, depending upon the circumstances.

The prime regulator of heat loss is skin temperature, which in turn is regulated by adjusting the blood flow to the extremities. The slow onset of exposure hypothermia will first affect muscle strength and dexterity as blood flow to the extremities is lessened to conserve heat. Next, judgment becomes clouded. Shivering commences as the body attempts to generate heat.

Medical studies have shown that shivering alone can produce ten times the heat that physicians can provide in an emergency room. If, despite shivering, the body continues to lose heat, it will stop shivering. The exact body temperature below which shivering is cut off is variable among individuals, but

is estimated to be in the low nineties. At this point, body temperatures fall precipitously. Therefore, when shivering stops it should by no means be interpreted as a sign that temperature has risen to normal. In fact, just the opposite may be occurring.

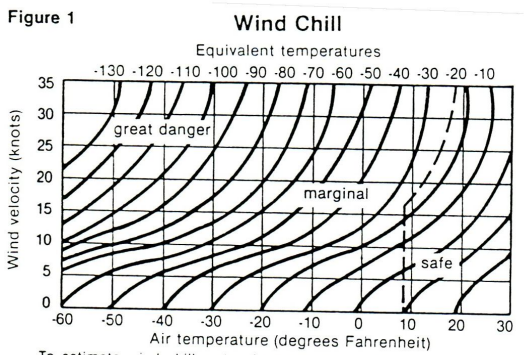
You should suspect that the hypothermia is worsening if shivering has stopped, but the patient is becoming more lethargic or confused, or if he has not been removed from the heat-losing situation. On the other hand, if shivering stops after your companion has been in a warm and dry cabin, with dry clothes, and is alert and exhibiting appropriate behavior, you may suspect he is improving.

The two best ways to prevent exposure hypothermia are to maximize the body's ability to prevent heat loss. Even adequate rest is helpful in protecting against hypothermia's effect upon judgment.

Frequent, small, light meals in an exposure situation are more efficient than larger meals taken farther apart. The use of high energy snacks, such as GORP ("Good Old Raisins and Peanuts") that mountain climbers carry, or cookies made from honey, grains, nuts and dried fruit, are good ways to supplement a regular diet.

Insulate the body from heat loss by packing particular attention to heat loss areas, especially the head, neck, trunk and groin. For the head, a wool watch cap is excellent protection. As mentioned previously, the body can decrease heat loss from the extremities by shunting blood back to the core, but this mechanism is not available to the head. A person in a heavy arctic parka can become easily hypothermic if his head is uncovered.

Figure 1



To estimate wind chill, enter the table from the bottom at air temperature. Go straight up to the appropriate wind velocity, then follow curved line upward. Read estimated equivalent temperature in degrees where the curved line crosses the top of the graph. Note that wind chill is even more pronounced if you are wet. (Adapted from the National SAR Manual)

The neck is another area where heat loss can rapidly occur. Thus, turtlenecks are better than open-necked garments.

Ideally, you should stay dry. The rate of heat loss can increase up to 25 times more rapidly than its basal rate (when you are dry) if you are wet, especially if there is even the slightest breeze to increase evaporation of the skin. If you are wet and unable to get dry, wool clothing is most effective. Wool will remain effective as an insulator even when soaked, but cotton and most other synthetic fabrics will not.

A major exception is found among the polypropylene "long johns" which draw water away from the skin. This is the best choice of fabric for those who are either allergic to or intolerant of wool undergarments.

Layering clothing is another effective technique. Two thin sweaters are more effective than a single heavy one because of the air trapped between them. Long underwear, particularly wool, traps a layer of warm air next to your skin, and contributes, perhaps more than any other layer, to the maintenance of body temperature. Mittens are better than gloves, since they allow the fingers to warm each other.

I also prefer to use boots with an interchangeable inner liner, and I carry an extra pair of liners with me. Thus, as part of my survival kit, I keep several wool watch caps, wool long johns, mittens and dry socks. They are not heavy and take up very little space.

Just this past November, a hunter fell through some ice on Admiralty Island (in Southwest Alaska), immersing himself to the waist. The outside air temperature was approximately 25 degrees, and snow was falling. Due to weather conditions, rescue would not have been imminent if he had suffered hypothermia. He immediately removed his wet clothing and donned a dry pair of wool fishnet long johns. He then wrung out his polypropylene underwear, and wore them over the wool. He put on a spare pair of wool pants, and changed his socks and the liner in his boots.

He saved his life by preventing hypothermia; that is, he logically assumed that hypothermia would quickly ensue. Had he delayed protective action, the outcome might have been different.

The symptoms of hypothermia are extremely difficult to detect, especially in yourself. If you are alone in weather conditions where hypothermia is a threat, i.e., anywhere in Alaska or wherever one may be exposed to freezing temperatures of cool water immersing, remind yourself to be constantly on guard. During my incident in the mountains I was so disoriented I didn't realize I was in danger. Sitting in that

snow bank in the freezing rain, I commented on the pleasant weather and insisted that I was feeling rather warm. By that point I was too hypothermic to realize I was suffering from heat loss.

In addition, my friends were oblivious to my condition, having convinced themselves that I was just a sorehead because we did not pursue our climb to the summit that day. It is important to keep an eye out for the early signs of hypothermia while you still have the capacity to do something about it.

Watch for clumsiness, weakness, decreased dexterity, agitation, impatience, apathy, lethargy, and poor judgment. Commonly, hypothermic individuals will attempt to remove clothing even outdoors. This is known as “paradoxical undressing” and indicates the state of confusion that accompanies the onset of severe hypothermia.

Even if a person is removed from a chilling environment, the body temperature can continue to fall. It is extremely important to begin rewarming even conscious and ambulatory exposure victims, using the exact techniques you would use with someone who had fallen into an icy lake.

Make every effort to summon rescue, since the cold outdoors is never a place to adequately rewarm someone. Hypothermia is a medical emergency. Even when you think the victim is improving, the situation can turn sour very quickly. The onset of slurred speech, stupor that simulates drunkenness and constant falling indicated that a life-threatening emergency is approaching. Therefore, summon help early rather than late, especially if night is approaching-which can impede rescue efforts.

Threat the hypothermic individual with great care. In severely hypothermic patients, excess activity can precipitate fatal cardiac arrest. Do not give him alcohol, caffeine, or any extremely hot liquids. Alcohol will shut off the shivering reflex, which results in a rapid fall of body temperature.

Warm, sweet liquids, such as soup, cocoa, or juices, will provide the body with sugars to generate heat, but the heat itself from hot liquids will not affect the body temperature at all. No food or liquid should be given to any person who is so groggy that he might choke, as this would precipitate dangerous lung or heart problems.

If dry clothing is available, carefully change the victim’s clothes, being sure to keep the skin and hair dry. Provide insulation from the ground, with branches, cushions, or anything you have available.

I have seen trauma victims at the scene of an accident, covered with down parkas to prevent heat loss, but lying un-insulated from the cold, often wet, asphalt. As much as possible, place the victim in a warm and dry environment, such as near a fire. In heavy snow, snow caves are extremely useful, in that body heat from several persons in a closed area can significantly raise the temperature.

The ability to actively rewarm a hypothermic person depends upon your available resources. Not much more can be done in a wrecked aircraft or in a snow cave. If a sleeping bag or blankets are available, do not neglect the often scoffed at, but lifesaving, techniques of placing the victim in the sleeping bag with one or two other persons.

If equipment is available, place warm towels or hot water bottles against the victim’s trunk, armpits, groin and neck. Concentrate on rewarming the head and trunk, and allow the extremities to slowly rewarm themselves as the core temperature improves.

Monitor the victim constantly. If he suffers a cardiac arrest, which is the common cause of death in hypothermia, begin CPR at once. There are many examples of people who have been successfully resuscitated after being hypothermic. Although our techniques for rewarming in the emergency room are different than those in a mountain cabin, one rule still applies universally-that is, you’re never declared dead until your temperature has been restored to normal

I came very close that time on the mountain. The hypothermia sneaked up on me because I never stopped to think that conditions were ripe for it. And I never even felt cold.