

How to recognize Symptoms of Heat Related Illness

Heat Related Illness covers a spectrum of complaints, from relatively benign heat cramps, to more serious Heat Exhaustion to potentially fatal Heatstroke. The two key points to keep in mind in are the importance of early recognition and, especially, prevention. Death from heatstroke is entirely preventable.

Children are at greater risk to develop than adults for several reasons, including:

- a higher ratio of body surface area to body mass
- fewer sweat glands and, therefore, less sweat production
- greater endogenous heat production
- dependence on others to provide fluid and shade

Heat Cramps

Muscle cramps caused by body salt depletion (sodium and or potassium)

Cramps consist of brief, severe muscle contractions most often affect the legs, shoulders, and abdomen that typically, they last for less than a minute. Body temperature remains normal. (<100.4 F)

Cramps usually occur in clusters. They may happen at the time of exercise or, more commonly, later when the patient is relaxing or taking a shower. Heat cramps themselves are not serious, but the pain may be severe enough to bring the patient to medical attention. Moreover, they may be a sign of impending heat exhaustion, especially if they occur during strenuous activity.

Heat Exhaustion

Consist of symptoms of Heat cramps plus body fluid deficiency

The most common cause is excessive sweating (fluid loss) and inadequate intake.

A second form of Heat Exhaustion can occur with body sodium depletion with relative adequate fluid replacement. Patients may have symptoms of Heat Cramps with relative or minimal signs of Heat Exhaustion. .

Signs and symptoms of heat exhaustion are usually vague and subtle initially so it is imperative to maintain a high index of suspicion, when the environmental factors are right.

Affected children may exhibit nausea, vomiting, headache, and mild temperature elevation. (T>.100.4F & < 105F)

Signs and symptoms are the same as those that may accompany common viral illness, so it is imperative to be alert to the possibility of heat illness in the summer months. The mental status of children with heat exhaustion is generally relatively normal, but they may complain of weakness, dizziness, mild confusion, or syncope (passing out).

It is important to recognize, however, that heat exhaustion can be a precursor and progress very rapidly to heat stroke, so aggressive management is key.

Heat Stroke

Heat Cramps + Heat exhaustion + loss Heat regulation with circulation failure and organ injury

This is a life threatening emergency

The body is now unable to compensate for the temperature elevation.

Characterized by core body temperature greater than 40.5° C (105° F). Often much greater

It is classified as classic or exertional, although patients may have a combination of both types.

Classic heatstroke (impaired heat dissipation) is seen most often in infants and children with an underlying medical problem and /or a current febrile illness. It arises from failure of the body to regulate temperature and/or exposure to a hot environment. The process usually develops slowly, over days, typically during a heat wave. The patient exhibits the classic triad of hyperthermia, coma, and hot, dry skin.

Exertional heatstroke (excessive heat production) commonly occurs in young athletes and military recruits, often at the start of the sport season or the beginning of boot camp, before the patient is adequately conditioned and acclimated. As with classic heatstroke, patients have elevated core body temperature and central nervous system impairment but often are still sweating at the time of presentation. The hyperthermia of exertional heatstroke may progress rapidly to cardiovascular collapse. Heatstroke is a life-threatening emergency and must be treated promptly and aggressively. Morbidity and mortality are directly related to the duration of elevated core body temperature. Untreated heatstroke leads to multisystem organ failure. Death results from respiratory and cardiovascular collapse.

Notes: as suggested above, the symptoms of heat related illness can be accumulative (over several days) Symptoms of heat exhaustion can mimic viral illnesses and viral illnesses can place the patient more susceptible to heat related illnesses.

Recommendations for Avoiding Heat related Illnesses

The American Academy of Pediatrics has prepared recommendations for children and adolescents who exercise in hot weather.

To avoid Heat related Illness patients should to reduce the intensity of activities that last for more than 15 minutes when temperature and humidity are high. At the beginning of a strenuous exercise program or after traveling to a hotter environment, a child should be allowed to acclimatize to the new regimen or environment. Acclimatization should, ideally, occur over 10 to 14 days and comprise eight to 10 exposures, lasting 30 to 45 minutes each. These exposures should occur once a day or once every other day. When such a period is not possible, the length of time participants are allowed to participate in practice and competition should be limited.

Aerobic exercise in a cooled environment may also improve the ability to acclimatize. Athletes are encouraged to engage in 20 minutes of aerobic exercise in an air condition environment 3 to 5 times a week for 2 to 3 weeks in order to facilitate transition to outdoors.

Children should also be well-hydrated before participating in activities, and periodic drinking should be enforced during activities. The child should not wait until thirsty in order to drink fluids.

It is recommended that for every 20 minutes of exercise, a child weighing 40 kg should drink 5 oz of fluid and a 60-kg adolescent should drink 9 oz. Water is an acceptable beverage for events lasting less than one hour but, if the event is longer than an hour, fluids containing glucose and electrolytes must be provided.

Weighing an athlete before and after an event can provide information about hydration status. Assume any weight loss is fluid loss and be sure the child replaces those fluids before the next activity.

Clothing should be light-colored and lightweight. It should also be limited to one layer to facilitate evaporation of sweat. When clothing becomes saturated with sweat, the child should change into dry garments.

Other heated environments that are particularly hazardous to young children are saunas, whirlpools, and hot tubs. Water is an excellent conductor of heat, and children, with their relatively large body surface area, are particularly sensitive to the transfer of heat from water. They are thus likely to fall victim to heat-related illness in these environments long before adults who accompany them.

Be aware of certain variables may increase a particular child's chances of developing heat-related illness. Increased heat production can be exacerbated by febrile illness, and certain drugs and substances of abuse. Certain preexisting medical conditions such as cystic fibrosis, hyperthyroidism, diabetes, muscle disorder and neurological conditions can also predispose to heat related illnesses. It is important to inform patients (and parents) that they are more susceptible to heat-related illness when they have a febrile illness, preexisting condition or if they are taking drugs such as antihistamines/cold medicines, tricyclic antidepressants or illicit drugs amphetamines, cocaine, phencyclidine (PCP)

Variables that impair the body's ability to dissipate heat include heat-retaining clothing such as multilayer and occlusive garments, obesity, dehydration, and skin conditions such as extensive sunburn. Keep these in mind and counsel your patients and their parents accordingly as summer months approach.

Prevention, prevention, prevention. It cannot be stressed enough that death from heatstroke is entirely preventable. Recognizing all forms of heat-related illness early and treating them aggressively, so that the patient does not progress along the continuum toward heatstroke, is crucial. Educate your patients to recognize signs and symptoms of heat illness, and take an active role in educating patients, families, and communities about how to avoid this potentially fatal condition.

Treatment of Heat Related Illness

Prevention, prevention, prevention (see above)

Heat Cramps: Rest, massage, oral fluids and remove the patient from the hot environment and transfer to a shady place, a cool vehicle, or a cool building. Take temperature to make sure there is no progression to Heat Exhaustion. Call the Doctor if the symptoms are frequent, recurrent or associated with exertion. See also prevention above.

Heat exhaustion: oral fluids and remove the patient from the hot environment and transfer to a shady place, a cool vehicle, or a cool building. Drive you child to emergency room to make sure there is no progression to Heat Stroke and for consideration for IV fluids and temperature monitoring.

Heatstroke: Go to the nearest Emergency Room ASAP and strongly consider calling an ambulance to start treatment en route.