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GUIDE LINE FOR HEAT WAVE

Abstract

Heat stroke is a commonest mismanaged and obscure medical emergency in tropics especially in Pakistan. Few guide lines in Pakistan are available which are not sufficient for proper management of this environmental emergency

What is heatstroke?

Heatstroke is a life-threatening condition that causes your body to overheat. It's defined as a body temperature above 104 degrees Fahrenheit (40 degrees Celsius). Heatstroke, also called sunstroke, is the most severe form of hyperthermia, or heat-related illness. Heatstroke can lead to brain damage, organ failure or death.

Are there different types of heatstroke?

There are two types of heatstroke:

1. Exertional. This form of heatstroke is usually the result of physical overexertion in hot, humid conditions. It can develop in a few hours.
2. Non Exertional. Also called classic heatstroke, this type can occur due to age or underlying health conditions. It tends to develop over several days.

Are heat exhaustion and heatstroke the same thing?

Heat exhaustion and heatstroke are both types of hyperthermia. Heat exhaustion can develop into heatstroke if left untreated. But heat exhaustion isn't as severe as heatstroke, doesn't cause neurological problems and usually isn't life-threatening.

Who gets heatstroke?

Anyone can get heatstroke. But infants and the elderly are at especially high risk because their bodies may not be able to regulate temperature effectively. Athletes, soldiers and people with occupations that require physical labor in hot environments are also susceptible to heatstroke.

Other factors that increase your risk of heatstroke include:

- Male.
- Dehydrated
- Patients on diuretics, Atropine
- Having certain Lung diseases like COPD.
- Addison disease, Hyperthyroidism, hyperparathyroidism
- Wearing heavy or tight clothing, such as protective gear.
- Obese
- A past history of heatstroke.
- Laborers working in farm, nuclear plants, radiation exposure, congested environments.

How common is heatstroke?

Pakistan has experienced several severe heat waves in recent years, with the most notable ones occurring in 2015 and 2018. The 2015 heat wave in Karachi resulted in over 1,200 deaths and thousands of cases of heat stroke and heat exhaustion.

Pathophysiology

The body's ability to dissipate heat through increased cardiac output, vasoconstriction of splanchnic circulation, and sweating maintain the effective temperature range of these proteins. However, if environmental humidity is above 75%, evaporative cooling begins to become ineffective. The other methods of heat loss, including radiation, conduction, and convection, do not transfer heat well when the temperature outside the body exceeds the temperature of the skin

Subsequent inadequate water repletion may lead to substantial electrolyte abnormalities. Primarily, normonatremia or hypernatremia dehydration follows. If severe enough, it may lead to hemorrhage, brain edema, and permanent brain damage. Subsequent inadequate water repletion may lead to substantial electrolyte abnormalities. Primarily, normonatremia or hypernatremia dehydration follows. If severe enough, it may lead to hemorrhage, brain edema, and permanent brain damage.

What are the signs and symptoms of heatstroke?

Heatstroke is a medical emergency.

- Dry skin that doesn't sweat, which is more common in non-exertional heatstroke
- problems with movement and coordination
- vertigo
- Confusion or disorientation.
- Excessive sweating that continues after you've stopped exercising (more common in exertional heatstroke).
- Hot, flushed skin or very pale skin.
- Hypotension
- Lung crackles
- Nausea and vomiting
- Oliguria (low urine output).
- Rapid breathing or tachycardia.
- Seizures.
- Fainting or loss of consciousness.
- Weakness.

What are the potential complications of heatstroke?

People with heatstroke can develop shock or slip into a coma. High body temperature can lead to:

- Adult respiratory distress syndrome
- Cerebral edema
- Acute kidney injury
- Hepatic injury, failure
- Metabolic dysfunction.
- Nerve damage.
- Reduced blood flow to the heart and other circulatory problems.

How is heatstroke diagnosed?

- Physical examination
- Rectal temperature
- CBC
- PT/PTT
- Arterial Blood gases
- , serum CPK, and urine myoglobin
- . Based on clinical judgment, some patients may also benefit from toxicology screening, chest radiograph
- ECG

How is heatstroke treated?

Heatstroke requires immediate medical treatment. If you're waiting for an ambulance to arrive, try to cool the person as much as possible by:

- Applying ice packs to the neck, groin and armpits.
- Encouraging them to drink slightly salted fluids, such as sports drinks or salted water.
- Having them lay down in a cool, shady, well-ventilated environment.
- Immersing them in cool water, if possible.
- Misting them with water and blowing air across their bodies (evaporative cooling).
- Monitoring their breathing carefully and removing any airway blockages.
- Not giving any medications, including aspirin and acetaminophen.
- Removing any clothing that is tight or heavy.

At the hospital, the person with heatstroke may receive:

- Cooled intravenous fluids through a vein in their arm.
- Cooling blanket.
- Ice bath.

- Medication to prevent seizures. Benzodiazepines
- Dantrolene in rigid patient
- Supplemental oxygen.

Sometimes cold-water lavage is necessary.

This treatment uses catheters (thin, flexible tubes) to fill body cavities with cold water. This helps lower the body temperature overall. The catheter may go into the rectum or down the throat.

Healthcare providers stop cooling treatments once the body reaches about 102 degrees Fahrenheit (38.9 degrees Celsius). The length of time you stay in the hospital depends on the severity of your heatstroke and how well your organs are functioning.

How can I prevent heatstroke?

In most cases, it's possible to prevent heatstroke by:

- Avoiding strenuous physical activity in hot, humid conditions.
- Consuming sports drinks, lightly salted water or broth.
- Gradually letting your body acclimate to warm temperatures over several weeks if you'll have to be in hot conditions for work or sports.
- Never leaving children (or pets) in closed, hot spaces such as cars.
- Staying in air-conditioned or well-ventilated areas during heat waves.
- Wearing lightweight, light-colored and loose-fitting clothing if you'll be out in the heat.
- Using Umbrella when going outside
- Establishment of Cool Spots with Facility of Cold Drinking Water, Showering Head and Shade for Rest.
- Availability of Air-Conditioned Ambulances for Shifting of Patients.

Post Heat Stroke Monitoring

What's the prognosis (outlook) for people who've had heatstroke?

Your outlook after heatstroke depends on a variety of factors, including:

- Age.
- How high your body temperature spiked
- How long your body temperature stayed high before you received treatment.
- Overall health.

Between 10 and 65% of people with non-exertional heatstroke die from the illness. The outlook is better for exertional heatstroke, which has a mortality rate of 3 to 5%. Some people experience permanent organ damage or neurological dysfunction.

During your recovery after heatstroke, patient can expect changes in the body temperature for several weeks.

Patient should avoid physical activity for at least a week. Patient will also need periodic tests to monitor your kidney and liver function. Even temporary complications of heatstroke can take several months to go away.

After had heatstroke once, Patient more likely to get this heat illness again. Take preventive measures any time the Patient plan to be in hot conditions.

Conclusion and Future Directions

Addressing the incidence of heat stroke in Pakistan requires a multifaceted approach involving climate adaptation strategies, improved urban planning, and robust public health interventions. Collaboration between government agencies, healthcare providers, and communities is essential to mitigate the impact of heat waves and reduce the incidence of heat stroke.

For detailed statistics and more specific information, local health departments and meteorological data should be consulted. Continuous research and data collection are crucial for developing effective strategies to combat heat-related illnesses in Pakistan.

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