Near Drowning

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Near drowning is severe oxygen deprivation (suffocation) caused by submersion in water but not resulting in death; when death occurs, the event is called drowning.

When a person is submerged under water, water enters the lungs. The vocal cords may go into severe spasm, temporarily preventing water from reaching the lungs. When filled with water, the lungs cannot efficiently transfer oxygen to the blood. The decrease in the level of oxygen in the blood that results may lead to brain damage and death. Water in the lungs, particularly water that is contaminated by bacteria, algae, sand, dirt, chemicals, or a person's vomit, can cause lung injury.

Children younger than 4 years are at greatest risk of near drowning because their energy and curiosity can easily lead them to fall into water, including bathtubs and large buckets, from which they cannot escape. In teenagers and adults, near drowning is common in those who are intoxicated, who have taken sedatives, who have had a seizure, or who are physically impaired because of a medical condition. Spinal injuries and paralysis caused by diving accidents, which are likely to occur when diving into shallow water, increase the chances of near drowning. People who intentionally hold their breath under water for extended periods may pass out and be unable to surface, thus increasing the risk of near drowning as well.

Submersion in cold water has both good and bad effects. Cooling of the muscles makes swimming difficult, and dangerously low body temperature (hypothermia) can impair judgment. Cold, however, protects tissues from the ill effects of oxygen deprivation. In addition, cold water may stimulate the mammalian diving reflex, which may prolong survival in cold water. The diving reflex slows the heartbeat and redirects the flow of blood from the hands, feet, and intestine to the heart and brain, thus helping to preserve these vital organs. The diving reflex is more pronounced in children than in adults; thus children have a greater chance of surviving prolonged submersion in cold water than adults.

Symptoms and Diagnosis

People who are drowning and struggling to breathe are usually unable to call for help. Children who are unable to swim may become submerged in less than 1 minute compared with adults, who may struggle longer.

People who are rescued may have symptoms ranging from anxiety to near death. They may be alert, drowsy, or comatose. Some may not be breathing. People who are breathing may gasp for breath or vomit, cough, or wheeze. The skin may

appear blue (cyanosis), indicating insufficient oxygen in the blood. In some cases, respiratory problems may not become evident for several hours after near drowning.

A doctor diagnoses near drowning based on the events and the person's symptoms. Measurement of the level of oxygen in the blood and chest x-rays help reveal the extent of lung damage.

Prevention

Swimming pools should be adequately fenced, because they are one of the most common sites of near-drowning accidents. In addition, all doors and gates leading to the pool area should be locked. Children in or near any body of water, including pools and bathtubs, need constant supervision, regardless of whether flotation devices are used. Because a child can drown in only a few inches of water, even water-filled containers, such as buckets or ice chests, can be hazardous.

A person should not engage in swimming or boating when under the influence of alcohol or sedatives. Swimming should be curtailed if a person feels or looks very cold. People who have seizures that are well controlled need not avoid swimming but should be careful near water, whether boating, showering, or bathing.

To decrease the risk of drowning, a person should not swim alone and should swim only in areas patrolled by lifeguards. Ocean swimmers should learn to escape rip currents (strong currents that pull away from the shore) by swimming parallel to the beach rather than by swimming toward the beach. Wearing life jackets when in boats is encouraged for everyone and is required for nonswimmers and for small children, who should also wear a life jacket when playing near bodies of water. Spinal injuries can be prevented by not diving into shallow water.

Treatment

Immediate on-site resuscitation is the key to increasing the chance of survival without brain damage. Attempts should be made to revive the person even when the time under water is prolonged. Artificial respiration and CPR should be provided as necessary. The neck should be moved as little as possible if there is a chance of spinal injury. Anyone who nearly drowns must be transported to a hospital, by ambulance if possible.

In the hospital, most people need supplemental oxygen, in some cases given with the help of a ventilator. A ventilator can deliver oxygen using high pressures to reinflate collapsed sections of the lungs. If wheezing develops, bronchodilator drugs can help. In some cases, treatment with oxygen in a high-pressure

(hyperbaric) chamber may be tried.

If the water was cold, the person may have a dangerously low body temperature (hypothermia) and may need warming. Spinal injury requires special treatment.

If a person who was submerged has only mild symptoms, discharge home may be possible, but only after several hours of observation in the emergency department. If symptoms persist for a few hours, or if the level of oxygen in the blood is low, the person needs to be admitted to the hospital.

Prognosis

The factors that most influence the chances of survival without permanent brain and lung damage are the duration of submersion, the water temperature (cold water accidents can have a better outcome), the person's age (children are more likely to have a better outcome), and how soon resuscitation begins. People who have consumed alcoholic beverages before submersion are especially likely to die or develop brain or lung damage. Survival is possible after submersion for as long as 40 minutes. Almost all people who are alert and conscious upon their arrival at the hospital recover fully. Many people who need CPR can also recover fully.