

UNITED STATES MARINE CORPS
FIELD MEDICAL TRAINING BATTALION
Camp Lejeune, NC 28542-0042

FMST 109

Treat Dehydration Casualties

TERMINAL LEARNING OBJECTIVE

1. Given a casualty, equipment and supplies, **treat dehydration casualties** within the scope of care reducing the risk of further injury or death. (8404-MED-2017)

ENABLING LEARNING OBJECTIVES

1. Without the aid of reference, given a description or list, **identify the predisposing factors associated with dehydration**, within 80% accuracy, in accordance with the Pre-Hospital Trauma Life Support, Current Military Edition. (8404-MED-2017a)
2. Without the aid of reference, given a description or list, **identify signs and symptoms of dehydration**, within 80% accuracy, in accordance with the Pre-Hospital Trauma Life Support, Current Military Edition. (8404-MED-2017b)
3. Without the aid of reference, given a description or list, **identify the treatments for dehydration casualties**, within 80% accuracy, in accordance with the Pre-Hospital Trauma Life Support, Current Military Edition. (8404-MED-2017c)
4. Without the aid of reference, given a description or list, **identify preventive measures for dehydration**, within 80% accuracy, in accordance with the Pre-Hospital Trauma Life Support, Current Military Edition. (8404-MED-2017d)
5. Without the aid of reference, given a description or list, **identify the treatment of hyponatremia**, within 80% accuracy, in accordance with the Pre-Hospital Trauma Life Support, Current Military Edition. (8404-MED-2017e)

OVERVIEW

Water is the largest component of the human body, accounting for 45% to 70% of body weight. It is a fundamental component of all cells and is used to carry out normal functions in the body such as circulation of blood, respiration and elimination of waste. Water is the basis of blood, lymphatic fluids, perspiration, mucous, saliva, and digestive juices. Water lubricates the joints, moisturizes the skin, provides moisture to all of the muscles and internal organs and helps regulate body temperature.

Excessive changes in the normal body water balance resulting from either overconsumption of water or fluid loss alter homeostasis, producing specific signs and symptoms. Dehydration is loss of water and important blood salts like potassium (K⁺) and sodium (Na⁺). Vital organs such as the kidneys, brain and heart cannot function without a minimum amount of water and salt. Acute dehydration can be a serious outcome of both heat and cold exposure, but it is also seen as a dangerous side effect of diarrhea, vomiting and fever.

1. PREDISPOSING FACTORS

Key factors that contribute to dehydration include:

Alcohol consumption

Medications (especially for high blood pressure, colds or diarrhea)

Higher Body Mass Index/ Low level of physical fitness

Inadequate diet

Improper clothing

Medical Conditions (fevers, vomiting, diarrhea, heat rash or sunburn)

Age (Thermoregulatory capacity decreases with age)

Fatigue/lack of sleep

Lack of recent experience in a hot environment or improper acclimatization

2. SIGNS AND SYMPTOMS OF DEHYDRATION

With mild to moderate levels of dehydration, individuals experience fatigue, headache, decreased heat tolerance, cognitive deterioration, reduction in strength and aerobic physical capacity.

The following are the most common signs and symptoms of dehydration although each individual may experience symptoms differently:

Less frequent urination and dark color urine

Thirst

Fatigue

Light-headedness

Headaches
Dizziness
Dry skin, decreased turgor (see figure 1)
Confusion
Dry mouth and mucous membranes
Increased heart rate and breathing



3. **TREATMENT OF DEHYDRATION**

Identify the cause and treat it. (i.e. vomiting/diarrhea)

Assess the level of dehydration based on signs or symptoms.

Re-hydrate the patient:

Oral re-hydration - drinking fluids usually relieves mild dehydration.

IV fluids - used for moderate to severe dehydration. We will discuss types of IV fluids later in the course.

Figure 1. Skin with decreased turgor

4. **PREVENTIVE MEASURES FOR DEHYDRATION**

A common finding in dehydration casualties is that the individuals consume no fluid or low volumes of fluid during daily activities. We all lose body water daily through sweat, tears, urine, water vapor exhaled through respirations and stool. During heat exposure, body water is primarily lost as sweat. Individuals can sweat approximately 1 liter per hour. The key to avoiding the onset of heat illness is to maintain a body fluid balance and to minimize dehydration during daily activities. A key point to remember is that individuals normally do not perceive thirst until a deficit of approximately 2% body weight loss has resulted from sweating. So an individual weighing 200 pounds would not recognize being thirsty until he or she has lost 4 pounds of sweat! The following are examples of some measures to prevent dehydration:

Before activity - Drink extra fluid to produce urine output that is clear to straw color.

During activity - Take several fluid breaks per hour, drinking approximately 1 quart of fluid per hour.

Maintain a balanced diet - You can recover fluid loss from the foods you eat as well as from the fluids you drink. Fruits and vegetables can be a significant source of fluid intake. MRE's are formulated to provide the important electrolytes while in the field.

Avoid diuretic beverages - minimize consumption of alcohol, coffee, tea and carbonated beverages with caffeine.

Educate troops - education of troops is the key to prevention. There are many myths regarding hydration handed down from Marine to Marine. You need to stress that once troops are properly acclimatized to hot conditions, it is necessary to continue to properly hydrate. Hydration is a daily requirement. Just because they drank enough water yesterday does not

decrease their need for today. Troops should not use salt tablets to assist with dehydration unless directed to by a medical officer.

5. **HYPONATREMIA**

Exertional hyponatremia and water intoxication can occur when sodium and water loss in sweat results in dehydration and sodium depletion. Low sodium concentration disturbs the osmotic balance across the blood-brain barrier resulting in a rapid influx of water into the brain, which in turn causes cerebral edema. As with similar signs and symptoms of intracranial pressure (ICP) in head trauma, a progression of neurologic symptoms with hyponatremia will occur, such as:

- Headache
- Malaise
- Nausea
- Confusion/mental status changes
- Seizures
- Coma
- Permanent brain damage
- Death

Hyponatremia is typically seen in individuals during prolonged activity in hot environments, drinking water that exceeds sweat rate, failing to replace sodium loss from sweat. When trying to prevent dehydration, the casualty overhydrates solely with water creating an over dilution of sodium in the blood. Typically, these casualties have not consumed electrolyte drinks or have consumed energy food supplements containing no salt or in quantities insufficient to balance the loss of sodium in sweat.

Risk factors that may predispose a person to hyponatremia are:

- Exercise duration of greater than 4 hours or slow running/exercise pace
- Low body weight (especially females)
- Overhydration
- Nonsteroidal anti-inflammatory drugs
- Extreme hot or cold environments

The first step in treatment is recognizing the disorder and determining the severity. Mild symptoms should be managed by observing the patient and waiting for normal diuresis of excess fluid. Symptomatic patients should be placed in an upright position to maintain their airway and minimize any positional effect on ICP. Treatment of hyponatremia should only be performed by a medical officer. If you suspect a casualty has hyponatremia, TACEVAC as soon as possible.

Prevention of hyponatremia can be accomplished by educating troops on the importance of maintaining a proper balance of fluid and electrolytes in the field. MRE's provide a proper nutritional balance of sodium and electrolytes and should be consumed in their entirety throughout training.

REFERENCE

Pre-hospital Trauma Life Support, Current Military Edition

Dehydration Review

1. List predisposing factors for dehydration.
2. List signs and symptoms of dehydration.
3. Describe how to re-hydrate an individual.
4. Describe preventive measures for dehydration casualties.
5. Define hyponatremia.