The Importance of Adequate Hydration

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Adequate hydration is an essential requirement for wellness. This article addresses some of the ways hydration affects patient status and medical outcomes. The importance of hydration for wound prevention and treatment, in particular, will be discussed. Suggestions for ways to maintain hydration in a clinical setting are provided.

The Importance of Water

Water is the most abundant constituent of the body, accounting for approximately 72% of nonfat weight and 45% to 70% of total weight, depending on a person’s ratio of lean to fatty tissue. Water makes up nearly 75% of muscle and organs but only 20% to 30% of fat. Many metabolic reactions that occur in the body are dependent on water. Water also is critical to temperature regulation.

Water transports nutrients including vitamins, minerals, and amino acids throughout the body; it is an important source of several nutrients including magnesium, calcium, and fluoride. Solutes within the body, both organic and inorganic, dissolve into water. Water is the basis for the osmotic pressure exerted across membranes that moves solutes into or out of cells and plays a major role in maintaining blood volume and fluid and electrolyte balance. Eighty percent of blood volume is water.

Research suggests that aquaporins (hormonally regulated water channels in the collecting ducts of the kidneys) may play key roles in water transport functions, including fluid secretion from glands, neural signaling, and wound healing. More specifically, aquaglyceroporins are believed to be involved in skin hydration, cell proliferation, and fat metabolism via the regulation of glycerol content in various tissues.

The body regulates body water by balancing thirst and renal output. The average adult loses 1 L to 2 L of fluid daily in urine and an additional liter through breath, sweat, and feces. Exercise depletes the body of water and electrolytes, especially in hot and humid environments. Adequate hydration reduces athletes’ risk of injury and helps them maximize their performance.

Kidney stones may result from inadequate fluid intake or excessive sodium intake, among other factors. Patients subject to kidney stones are usually advised to increase their intake of water and other fluids (except tea) to decrease the concentration of their urine. Three to four quarts of fluids per day are generally recommended for those with normal kidney function. In addition, epidemiological studies have shown that coffee and citrus (with the exception of grapefruit juice) decrease the incidence of kidney stones.

Dehydration: Risk Factors and Consequences

Insufficient fluid intake can quickly lead to dehydration, which increases susceptibility to urinary tract infections, dental disease, constipation, pneumonia, confusion, and pressure ulcers. The risk of falls also is increased with dehydration. Dehydration is associated with a decline in nutritional status in adults and often precedes unintentional weight loss, failure to thrive, and skin breakdown and compromises overall quality of life in the long-term care setting. While people typically

Table 1. Risk factors for dehydration

<table>
<thead>
<tr>
<th>Risk Factors</th>
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<tbody>
<tr>
<td>Fluid losses such as those resulting from diarrhea, vomiting, fever, burn, or uncontrolled diabetes</td>
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<td>Fluid restriction due to chronic kidney disease or congestive heart failure</td>
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<td>Dementia, coma, or other decreased sensory function by which a patient may forget or be unable to drink</td>
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<td>Functional impairments such as restraints or aphasia that make drinking or communicating the need to drink difficult</td>
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<td>Inadequate fluid intake during intense exercise or hot, humid weather</td>
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<td>Excessive sweating</td>
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<td>Fluid losses due to evaporation from open pressure ulcers or wound drainage</td>
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<td>Dysphagia requiring thickened liquids</td>
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<td>Medications including diuretics, antihistamines, and antihypertensives</td>
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<td>Alcohol use</td>
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<td>Altitudes above 8,200 feet</td>
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<td>Acute illness</td>
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<td>Decreased thirst sensation associated with the normal aging process</td>
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can live without food for weeks, death from dehydration can occur in as little as 3 to 4 days. Severe dehydration requires immediate medical treatment.

Risk factors for dehydration include immobility, incontinence, inadequate nutrition and hydration, sensory deficits, comorbid conditions, and circulatory problems. Table 1 lists additional risk factors for dehydration. Older adults and people with chronic illnesses are most at risk for dehydration. Dehydration causes skin to become fragile and prone to breakdown, decreases the circulating blood volume, and reduces peripheral blood flow, impairing the delivery of nutrients and oxygen to wounds.

Length of stay, acute care readmission, and mortality are increased in dehydrated hospitalized older adults. Pressure ulcers, a sequelae of dehydration, are occurring with increasing prevalence in hospitalized patients; an estimated 2.5 million patients develop pressure ulcers in acute care settings, accounting for $11 billion annually in healthcare costs. Consequently, the Institute for Healthcare Improvement has named the prevention of pressure ulcers one of its 12 interventions in the 5 Million Lives Campaign.10

Long-term care guidance manuals specify that facilities, “must provide each resident with sufficient fluid intake to maintain proper hydration and health,” and regulations outline guidelines for the prevention of dehydration. In addition, the Nutrition Screening Initiative has developed a single-page tool to help identify those at risk for nutrition-related conditions, including dehydration.

The high prevalence of dehydration and pressure ulcers was highlighted by the Centers for Medicare and Medicaid Services’ Nursing Home Oversight and Monitoring Program. This program increased Certified Nursing Assistant (CNA) awareness and likelihood of reporting nutrition and hydration problems. It also assisted dietary managers, registered dietitians, and directors of nursing with incorporating nutrition and hydration best practices into dining programs.

Assessing Fluid Needs

Early assessment of risk factors is critical to preventing dehydration. Several validated tools exist for screening for nutrition and hydration status. The Minimum Data Set (MDS) and Resident Assessment Protocols (RAPs) governed by the Nursing Home Reform Act of 1987 address both nutrition and hydration.

Fluid needs should be assessed based on the summation of physical examination, review of relevant laboratory results, and fluid intake/output documentation, as well as individualized assessment considering medical history, reported symptoms, medications, and weight/weight changes. The clinical signs of insufficient fluid intake are outlined in Table 2. Laboratory values used in the assessment of hydration status are shown in Table 3. Periodic reassessment of hydration status by an interdisciplinary team that includes physicians, nurses, dietitians, speech pathologists, dentists, administrative personnel, and CNAs is recommended.8

The average adult needs 30 to 40 mL/kg body weight in fluid intake daily. Alternately, fluid needs may be estimated as 1.0 to 1.5 mL/kg expended daily, including calories expended through both metabolism and physical activity.14 The minimum daily fluid intake is 1,500 mL. This does not apply to patients with renal or cardiac stress that require reduced fluid intakes.

Patients with pressure ulcers require at least 30 to 33 mL/kg/day, with additional fluids to compensate for incidental losses including wound exudates, fever, vomiting, or diarrhea.12 Patients who use air-fluidized beds (usually those with multiple mid-body Stage III or Stage IV ulcers or those who have not improved with the use of low-air-loss mattresses) require an additional 10 to 15 mL/kg body weight.15,16

Fluid Sources

Foods are responsible for about 20% of the fluids consumed by most people. For example, fruits and vegetables are often more than 90% water by weight. Suggestions for improving fluid intake are provided in Table 4. The total daily fluid intake recommended by the Institute of Medicine (IOM) is approximately 11½ cups for women and 16 cups for men; however, available research has not yet adequately determined fluid needs in many populations.18

Although the majority of fluids are ingested as beverages, beverage content can vary widely. This feature can be used to one’s benefit in the clinical setting. For example,
malnourished patients can be given nutrient-dense supplements in addition to meals; whereas, persons who would benefit from weight loss or weight maintenance could be given calorie-free plain water most often. A large number of specialized nutrient-added waters and juices have recently become available in stores but few have any evidence to support their use. The belief that caffeinated beverages such as coffee and tea have a dehydrating effect has been shown to be false.3

Community-dwelling older adults frequently experience a mild decrease in subcutaneous blood flow as the result of inadequate hydration. Decreased plasma volume associated with dehydration impairs skin blood flow, restricting the delivery of nutrients to the organ. This impairment can slow wound healing and increase infection. Supplemental oral hydration (500 mL water) has been shown to improve skin microcirculation in the short term.18

Conclusion

Maintaining a state of euhydration can prevent numerous health problems. Improved understanding of skin physiology is providing hope for better methods of preventing and treating issues related to hydration. In the patient care setting, prompt and regular reassessment of dehydration risk factors by a multidisciplinary team of healthcare professionals is the first and most important step toward improving long-term health.

References