Dehydration in older people

There are significant challenges in diagnosing and managing dehydration in the elderly, write Genevieve Flynn and Shaun O’Keeffe

Dehydration is one of the most common diagnoses in older people admitted to hospital and is associated with a mortality rate within 30 days of admission of 18%. It is even more important in those aged 85 years or more, and in older nursing home residents. The prevalence in nursing homes may be as high as 35% and, left untreated, the mortality rate is over 50%.

Although early clinical recognition and intervention and the use of preventative measures are essential, there are significant challenges in diagnosing and managing fluid balance in the frail elderly.
Dehydration versus extracellular fluid volume depletion

It is important to distinguish between dehydration, which largely affects the intracellular spaces (making up two-thirds of total body water), and volume depletion affecting the extracellular spaces, including the vascular system, which makes up 8% of total body water.

Water moves freely by osmosis across cell membranes, while solutes (such as intracellular potassium and phosphate and extracellular sodium and bicarbonate) are effectively restricted to one side of the cell membrane. When water is lost from the gut, skin, or kidney, water losses equalise across the cell membrane and the hyperosmolarity (or hyperosmolality) initially created in the extracellular space spreads to, and has its greatest impact on, the larger intracellular space. As 92% of total body water losses are intracellular, only massive water losses will impact significantly on vascular volume.

Acute dehydration leads to thirst, via hypothalamic receptors that sense hyperosmolarity and to secretion of vasopressin (antidiuretic hormone) from the posterior pituitary gland, which reduces urinary water loss by promoting water reabsorption in the collecting ducts of the kidney. Hypernatraemia and hyperosmolality are the cardinal laboratory findings in dehydration, and the appropriate treatment is oral water or intravenous 5% dextrose; normal saline won’t correct the hyperosmolarity and will unnecessarily increase the extracellular volume.

In contrast, extracellular volume is mainly dependent on sodium intake and excretion, and extracellular volume depletion results from blood loss or a reduction in total body sodium content. Baroreceptors sense volume depletion and trigger intrarenal and neurohormonal responses to conserve sodium and water and appropriate treatment is with normal saline or other isotonic fluids.

Aetiology of dehydration in older people

The increased susceptibility of older people to...
Dehydration is multifactorial in origin (see Table 1). An age-associated reduction in thirst sensation with dehydration is the most important physiological change; impaired ability to concentrate urine in the ageing (or diseased) kidney is also significant. Environmental factors are particularly important in institutional settings dominated by the demented and the disabled.

Physical and cognitive problems mean that considerable staff time needs to be expended in assisting and encouraging adequate intake. This is not always available, and some studies suggest that the vast majority of nursing home residents fall short of recommended intakes; they are thus even more vulnerable to the added effect of intercurrent illnesses or of very hot weather.

**Diagnosing dehydration in older people**

The symptoms of early dehydration are often vague and non-specific and patients rarely complain of thirst or dry mouth. There may be gradual development of lethargy, anorexia, and if volume depletion is also present, light-headedness and orthostatic blood pressure drop. Chronic dehydration has been associated with constipation and with an increased rate of renal and urinary tract calculus formation.

Dehydration also alters the bioavailability of certain drugs such as opiates, which can result in increased rates of toxicity. If water isn’t replaced, delirium develops and ultimately coma and death occur. Clinical signs such as loss of skin turgor, sunken eyeballs, dry mucous membranes and tongue coating are relatively insensitive and non-specific in older people.

Absence of axillary moisture may be a more useful sign: although sensitivity is only 50%, specificity is over 80% in some reports.

**Management of dehydration**

The primary focus in vulnerable older people in the community or in nursing homes should be on prevention. Although their reliability is often questioned, especially in those with incontinence, use of weight measurements and intake and urinary output charts are essential in long-stay settings.

Although screening laboratory tests have not proven cost effective in long-term care settings, measurement of urea and electrolytes and osmolality are of great diagnostic value.

Ultimately, it is important to maintain a high

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**Dehydration key points**

- Dehydration in the elderly is quite common
- Insidious onset often with vague symptoms
- Hypernatraemic dehydration rather than volume depletion is characteristic of water loss
- Beware of reduced thirst sensation in older people
The index of suspicion for dehydration in those with risk factors or a history of hydration problems and especially during acute illnesses.

The recommended fluid intake for a 70kg adult is 1.5 litres per day, although it should be acknowledged that guidelines vary and the evidence base for such recommendations is slender. Detailed fluid balance studies have found individuals thriving clinically and biochemically on much smaller intakes. In those at risk for dehydration, education (of older people’s families and nursing home staff) on the importance of fluid intake, provision of fresh and palatable fluids and encouragement is essential.

The help of a dietitian and use of snack carts between meals have proved helpful in long-stay settings.

Oral rehydration is often effective in those with early dehydration. A variety of commercial drinks can be used if people find them preferable; soups and fruit juices may help with some people but the often higher osmolality of these substances should be considered if hypertonic dehydration is present.

Intravenous hydration is often the only alternative if oral hydration can’t be tolerated. This will usually require admission to hospital. An alternative that is available in some long-stay settings is administration of subcutaneous fluids (hypodermoclysis).

Fluid infused slowly into the subcutaneous space, usually through a small butterfly needle inserted in the chest wall under the clavicle, will gradually enter the circulation.

Hyaluronidase can be added to the infusion to help break down connective tissue, but is not essential. Using this approach, up to three litres (but only 1-1.5L of 5% dextrose) can be given over 24 hours.

While older patients should always be offered oral fluids if they are capable of taking them, maintenance of hydration is not the priority for the dying patient.

There may be benefits from dehydration in the terminally ill, including reduced lung secretions and less urinary incontinence. Dehydration is not painful and mucosal drying responds well to good oral care discomfort.

The benefits and disadvantages of aggressive treatment of dehydration should also be considered in those with severe dementia: the need for repeated intravenous drips and even for physical restraints to maintain the drip may eliminate the benefits of maintaining hydration. Education of and discussion with family and friends is essential in such cases.

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References on request