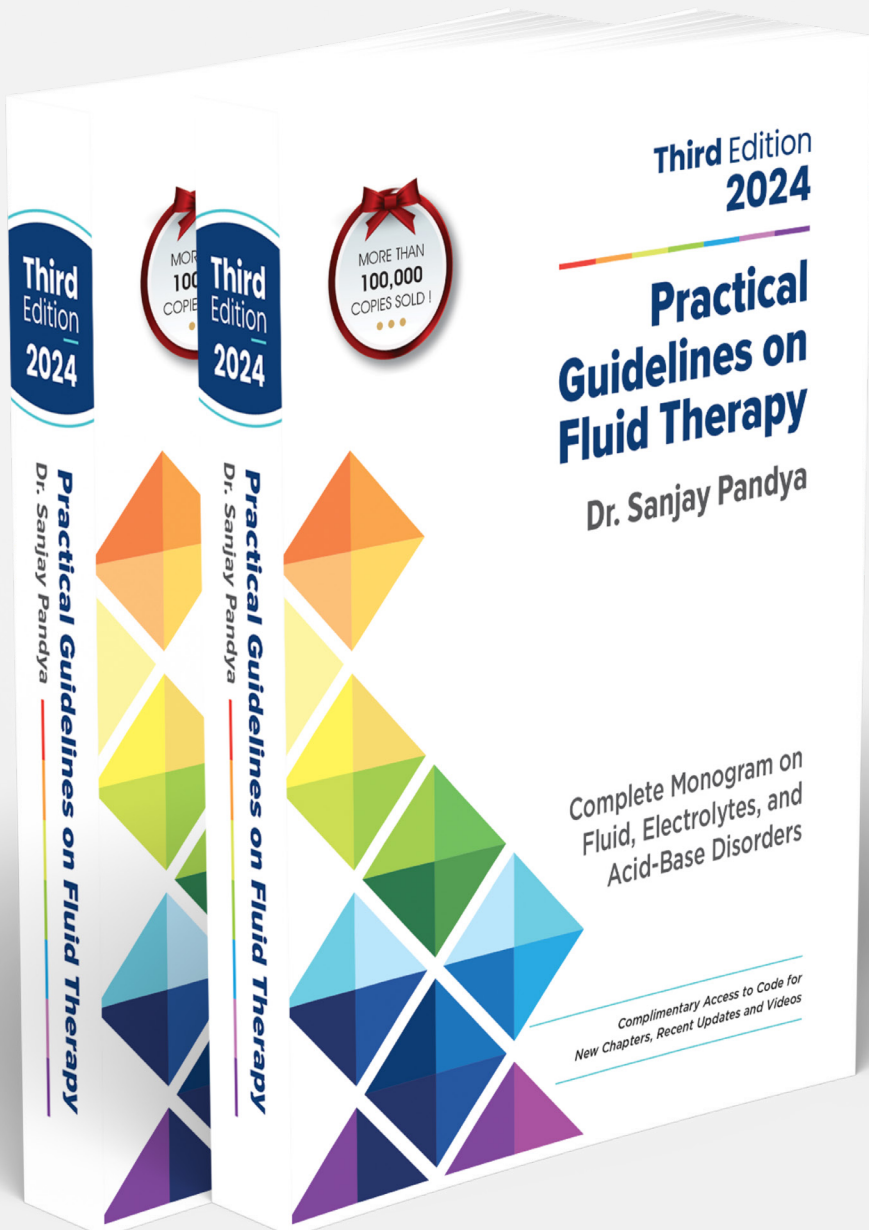




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## Chapter 9:

## Fluid Therapy in the Elderly



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# 9

## Fluid Therapy in the Elderly

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Globally, Life expectancy is increasing steadily [1], so there is a need to understand the medical problems of the larger elderly population.

### PHYSIOLOGICAL BASIS

To understand fluid and electrolyte disorders in the elderly, it is essential to understand physiological changes related to fluid balance in older adults. Significant relevant physiological changes are [2–5]:

- Decrease in total body water by about 10–15% due to reduced lean body mass.
- A reduction in thirst perception due to central nervous system dysfunction controlling thirst.
- Progressive reduction in renal blood flow, glomerular filtration rate and loss of renal mass.
- Impaired renal ability to concentrate urine and conserve water makes older adults prone to dehydration.
- Significant increase in atrial natriuretic peptide (ANP) activity and reduction in renin and aldosterone serum concentrations. These hormonal changes lead to an impaired ability to retain sodium,

causing a greater risk of developing hyponatremia and hypovolemia.

### Understanding the importance of dehydration in the elderly

It is essential to understand about dehydration in the elderly because:

- Hypovolemia is a common fluid and electrolyte disorder in the elderly [6, 7], which affects about 20% to 30% of older adults [8].
- Dehydration is the most common cause requiring hospitalization in the elderly [9, 10].
- Dehydration in the elderly is associated with a longer stay in the hospital, increased health care costs, morbidity and mortality [11–13].
- Dehydration in the elderly can cause problems like acute confusion, constipation, urinary tract infections, kidney stones, exhaustion, and pressure ulcers [14–16]. Elderly patients with dehydration can have orthostatic hypotension leading to impaired brain perfusion and dizziness, causing an

increased risk of falls and bone fractures [17].

- Timely aggressive fluid administration can improve clinical outcomes in dehydration [18].

## Higher risks of dehydration in elderly patients

Reasons for the higher risk of dehydration in the elderly are:

- Reduced total body water (TBW) as a portion of body weight, so the risk of dehydration even with a loss of less volume of fluids.
- Inability to access water due to physical limitations and lack of help.
- Inadequate water intake due to decreased thirst sensation and altered awareness or mental status [5].
- With aging, renal function and ability to concentrate urine and retain fluid decline [16].
- Among older people, the habit is drinking less water than younger people [19], and the daily fluid intake of older people is below the recommended daily requirement [16].
- Common medications for the elderly such as diuretics for hypertension, increase the risk of dehydration.

## DIAGNOSIS OF DEHYDRATION

In the elderly, commonly used signs and tests such as skin turgor, mouth dryness, weight change, urine color, specific gravity, or bioelectrical impedance are not useful in assessing hydration status [20, 21]. However, clinical clues like mental confusion, non-fluent speech, extremity weakness, dry mucous membranes, dry tongue, furrowed tongue, and sunken eyes provide important clues in diag-

nosing volume depletion in the elderly (the presence of  $\geq 4$  criteria out of 7 indicates volume depletion) [21].

Directly measured serum osmolality  $>300$  mOsm/kg is a reliable test to diagnose dehydration in the elderly [11, 21].

## NORMAL FLUID REQUIREMENT

The total fluid intake recommended for all ages by ESPEN (2022) and European Food Safety Authority (EFSA) 2010 guidelines is 2.5 L/day for men and 2.0 L/day for women [21, 22]. Out of total fluid consumed, drinking water or beverages account for 70–80%, and 20% come from consumed food [23].

Daily fluid intake is a minimum of 2.0 L/day for elderly males, and 1.6 L/day for elderly females is recommended by ESPEN and EFSA guidelines [21, 22].

## PREVENTION OF DEHYDRATION

Dehydration is highly costly in older people as it causes multiple complications and is associated with morbidity and mortality. On the other hand, optimum fluid intake and prevention of dehydration offer mental, physical, and general health benefits, provides a better quality of life for older people, and save money for healthcare systems [24].

Simple steps to prevent dehydration in older persons are to ensure access to oral fluids, frequent offering of drinks, and encourage the older adult to increase their fluid intake according to their preferences throughout the day [21, 25, 26].

As dehydration is expected in the elderly, all hospitalized old adult patients should be screened carefully for early detection, preventive measures, and

treatment if required, followed by frequent assessment of urine outputs and fluid balance during the hospital stay.

If diuretics are prescribed to the elderly, adjust their dose appropriately.

## MANAGEMENT

The basic principles of fluid management are:

- To provide the maintenance need for fluids and to correct volume depletion, elderly patients should be given fluids, preferably orally or nasogastrically.
- Euvolemic patients who may be nothing by mouth (NPO) may need intravenous maintenance fluids. The maintenance intravenous fluid requirement is lesser in the elderly. Maintenance of intravenous fluids recommended by NICE guidelines is about 20–25 mL/kg/day in the elderly, while intravenous (IV) fluid requirement in an adult person is approximately 25–30 mL/kg/day [27].
- Elderly patients have low body weight and lesser total body water (about 45–50% of body weight in the elderly compared to 50–60% of body weight in adults), so prescribe the total volume of fluids carefully.
- Cardiac or renal impairment is common in these patients, so avoid prescribing large volumes without assessing the patient's fluid status.

**The choice of IV fluids:** Hypovolemic older adults who cannot drink isotonic fluids should be administered intravenously [21]. The selection of IV fluids should be individualized based on the type of fluid lost and its composition and the electrolyte and acid-base status of the patient:

- Ringer's lactate and normal saline are the most widely used IV fluids

for resuscitation in hypovolemia and hypotension.

- Hypovolemia with hypernatremia due to water losses or poor intake needs supplementation of hypotonic fluid.
- In patients with diarrhea or metabolic acidosis, preferred IV fluids are balanced crystalloids like Ringer's lactate.
- Normal saline is preferred in patients with vomiting, hypovolemic hyponatremia, and metabolic alkalosis.

The volume of IV fluids administered needs careful attention and is determined based on appropriate clinical assessment, an accurate daily body weight, maintaining strict fluid intake and output chart, and measuring serum electrolyte, renal function, and serum osmolarity. Improvement in blood pressure and urine output usually suggests a response to fluid administration.

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