Dehydration and subcutaneous fluids



^{*}Where feasible, arrange telehealth or face-to-face GP review

1) Assessment of resident with dehydration

Goals of assessment include to assess hydration status and determine severity of dehydration, identify the cause of dehydration and to identify complications of dehydration.

A. Assess hydration status and determine severity of dehydration or volume depletion:

No single clinical or laboratory feature reliably predicts dehydration in older adults.

Assessment for dehydration or volume depletion may include^{1,2} :

Domain	Finding	Mild	Moderate	Severe
History	Fluid losses (diarrhoea, vomiting, diuresis)	+	++	+++
	Reduced overall intake ³	+	++	+++
	Postural presyncope or dizziness	+	++	+++
	New onset fatigue	+	++	+++
	Functional decline	+	++	+++
	Worsening confusion or altered level of consciousness	Alert	Confused	Altered level of consciousness
	Weight loss	<5%	5-9%	>/=10%
Examination⁵	Tachycardia⁴	+	++	+++
	Hypotension	-	-	+++
	Drop in systolic blood pressure on standing of >/=20 mmHg	+	++	+++
	Tachypnoea (respiratory rate >20 breaths per minute)	-	+	++
	Dry tongue	+	++	+++
	Dry oral mucous membranes	+	++	+++
	Longitudinal furrowing of the tongue	-	+	++
	Non-fluent speech	-	+	++
	Reduced axillary (armpit) sweating	+/-	+	+++
	Sternal skin turgor reduced	+	++	+++
	Sunken eyes	-	-	+++
	Extremity weakness	-	+	+++
Investigations	Plasma bicarbonate	Normal	Reduced	Markedly reduced
	Plasma osmolality	> 300 mOsm/kg (measured osmolality) or > 295 mOsm/kg (calculated osmolality) - note may be normal in volume depletion due to loss of fluid and electrolytes		

1 Adapted from eTG Gastrointestinal Guidelines: Assessing adults for dehydration. 2016. Melbourne: Therapeutic Guidelines Limited.

- 2 History and examination findings in older persons with dehydration are variable and should be interpreted in the context of the individual person. These findings have poor sensitivity and specificity however published data identifies that clinicians are consistent at identifying the same people as dehydrated even though they may use slightly different combinations of these parameters.
- 3 Unless there is a clinical contraindication, older women should be offered at least 1.6L and older men at least 2.0L of drinks each day (in air-conditioned environments). People obtain free water from oxidation and fluid from food which can contribute ~ 500-800mL of additional water daily.

4 Tachycardia may be blunted by beta-blockers and calcium channel blockers.

5 Daily weight measures may assist in assessing hydration status if recent baseline weight is known.

1) Assessment of resident with dehydration (cont'd)

B. Identify the cause of dehydration:

Common causes of dehydration in RACF residents include:

Domain	System	Example causes	
Reduced oral intake	Functional	Inability to feed independently Poor access to fluids (especially hot weather)	
	Psychological	Change in thirst - need to drink from habit, not thirst Depression Fear of choking Dislike of fluids offered or temperature of fluids offered (hot or cold) Cognitive impairment Fear of social embarrassment associated with incontinence	
	Oropharyngeal disease	Ulceration Obstruction (cancer, stricture)	
	Disorders of swallowing	Neurological (Parkinson's disease, recurrent strokes) Cognitive decline	
	Sedation	Medications Altered level of consciousness due to organic cause	
Increased fluid losses	Gastrointestinal	Vomiting or diarrhoea	
	Polyuria	Unstable diabetes Diuretics Hypercalcemia Reduced renal concentrating capacity	
	Insensible losses	Sweating Fear	
	Third space losses	Chronic liver disease Pancreatitis	

Where a cause of dehydration is not identified and does not resolve with simple therapy, in addition to GP review and where indicated, arrange screening for depression and cognitive impairment, swallowing evaluation, dental examination and a health assessment and medication review.

C. Identify the complications of dehydration:

Complications of dehydration include:

- 1. Postural hypotension
- 2. Decreased perfusion of vital organs:
 - Acute kidney injury
 - Delirium
 - Worsening of underlying angina
- 3. Fluid and electrolyte imbalance
- 4. Increased risk of:
 - Falls
 - Renal stones
 - Constipation
 - Pressure injuries
 - Mortality, particularly when dehydration is present in the setting of bacterial infection

2) Red flags for deterioration

Red flags for deterioration in residents with dehydration include:

- 1. Severe dehydration
- 2. Concurrent pulmonary oedema
- 3. Terminal care or nearing end of life
- 4. Coagulation defects
- 5. Concurrent infection and sepsis
- 6. Hyperactive delirium that may affect compliance with rehydration (oral or subcutaneous)

3) Escalation criteria

- 1. Unstable vital signs (refer to Recognition of the deteriorating resident)
- 2. Worsening confusion
- 3. Syncope or concurrent falls
- 4. Progressive worsening of dehydration rather than improvement
- 5. Development of any of:
 - Fever, infection or sepsis
 - Pulmonary oedema or a new oxygen requirement (refer to Recognition of the deteriorating resident)
 - Hyperactive delirium
 - Chest pain
- 6. Comorbidities that require stabilisation
- 7. Acute on chronic renal impairment
- 8. Electrolyte disturbance
- 9. Lymphoedema

4) Oral rehydration

Where the resident appears clinically well and is assessed to have mild dehydration, oral rehydration should be considered in those who are able to swallow adequately.

Where dehydration is due to reduced intake, the resident should be encouraged to drink fluid in the form of drinks preferred by the resident e.g. hot or iced tea, coffee, fruit juice, water or sparkling water.

Where there is volume depletion secondary to diarrhoea or vomiting or is associated with deranged electrolytes, an oral rehydration solution is recommended. Where the resident appears unwell and is dehydrated, subcutaneous fluids should be offered in parallel with encouraging oral fluids.

Strategies to increase oral intake of fluids should be implemented including:

- 1. High availability of drinks
- 2. Offering varied choice of drinks, including drinks and temperature of drinks that are preferred by the particular resident
- 3. Frequent offering of drinks encourage residents to drink out of habit, not thirst as thirst is often blunted
- 4. Staff awareness of the need for adequate fluid intake
- 5. Staff support in assisting oral intake and in assisting in regular and timely toileting when required
- 6. If thickened fluids are required and texture is appropriate, offer recognised foods such as custard and yoghurt first as these are often better accepted compared with unfamiliar thickened fluid

5) Subcutaneous fluid order

- 1. Isotonic fluids (e.g. 0.9% saline) are indicated in mild to moderate dehydration where oral rehydration alone is not suitable. Note: necrosis of the skin may occur if inappropriate fluids are used
- 2. The rate of administration of subcutaneous fluids should be individualised based on the degree of dehydration and resident comorbidities and ordered by the residents primary care provider

Generally, up to 60mL/hour is tolerated well however, caution is advised in those with a history of congestive cardiac failure or those on a fluid restriction or at risk of acute pulmonary oedema

- 3. Up to 2 sites may be used concurrently (e.g. 1L/day per site)
- 4. For maximum absorption, rotate the site regularly (at a minimum after every 2L of fluid)

6) Choose a site for administration of subcutaneous fluids

When selecting an appropriate site consider:

- 1. Resident mobility and agitation
- 2. Comfort and resident preference
- 3. Accessibility for routine checks
- 4. Skin condition
- 5. Presence of adequate subcutaneous fat (e.g. 1.0 to 2.5cm of subcutaneous fat):
 - anterior abdomen at least 4 fingers-breadth distant from the umbilicus; left iliac fossa is preferred due to increased distance between colon and the abdominal wall (avoid in residents with ascites)
 - anterior thigh (avoid in residents with peripheral vascular insufficiency)
 - upper outer arm (deltoid)

Avoid areas where skin has:

- 1. Lymphoedema
- 2. Bony prominences
- 3. Prior exposure to radiotherapy
- 4. Proximity to a joint
- 5. Proximity to a surgical or wound site or tumour
- 6. Evidence of infection or inflammation

7) Insert subcutaneous access

- 1. Insertion of subcutaneous access should only be performed by competent clinicians
- 2. Use aseptic non-touch technique
- 3. Perform skin antisepsis:
 - use a single-use sterile applicator containing sterile alcohol-based chlorhexidine solution
 - if the resident has an allergy to chlorhexidine, use povidone-iodine or 70% alcohol
 - allow the product to dry naturally on the skin after application
- 4. Use a small-gauge (24 to 27 G) and short-length non-metal cannula

e.g. Teflon® or Vialon® cannula, such as BD Say-T-Intima®) - these are associated with significantly less risk of site inflammation than metal butterfly needles

- 5. Remove and insert new device at a new site if blood returns during device placement
- 6. Secure using a transparent semipermeable membrane dressing to secure and allow observation and assessment



8) Monitor dehydrated resident and provide supportive care

Monitor residents with dehydration closely including:

- 1. Regular vital signs (frequency should be determined by severity of dehydration and underlying cause but should be performed at a minimum of once every 12 hours)
- 2. Daily weight may guide adequacy of fluid replacement if baseline weight is known
- 3. Oral or enteric intake
- 4. Urine output where a resident does not have a catheter
- 5. Fluid losses e.g. diarrhoea
- 6. Where subcutaneous fluids are used, the site should be checked every 4 hours for (and site changed if any of below identified):
 - redness
 - swelling or oedema
 - bleeding / bruising
 - leaking of fluid
 - pain
 - pooling or unresolved blanching
- 7. With GP review medications to assess for need to with-hold or adjust dose of medications such as diuretics and anti-hypertensives
- 8. Monitor for development of <u>red flags</u> or <u>scalation criteria</u>
- 9. Monitor skin integrity implement two hourly pressure cares where indicated
- 10. Maintain nutrition and monitor blood glucose level arrange dietitian review where indicated
- 11. Where resident has co-morbidities, monitor these to detect and address instability early

9) Prevention of dehydration

Ensure RACF has a strategy to reduce incidence of dehydration - example components of such a strategy may include:

- 1. Screening for hypohydration by inspecting tongue for dryness prior to administration of medications where identified, implement individual management plan to address
- 2. Staff education to improve awareness of importance of adequate fluid intake and common causes of dehydration to residents
- 3. Tailored oral fluid intake plans including:
 - a. Ensuring high availability of a range of drinks at different temperatures and suited to individual resident preferences and swallow
 - b.Teaching residents to drink from habit rather than only when thirsty
 - c. Regular toileting to avoid resident anxiety about incontinence impacting fluid intake

Dehydration and subcutaneous fluids references

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Dehydration and subcutaneous fluids version control

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