

Heat-related illness

Older people are at risk of heat-related illness, especially if overweight or obese or have low cardiovascular fitness. Older people have diminished sweating ability and reduced thirst awareness just as a consequence of ageing.

Global temperatures are increasing due to climate change. Heatwaves are predicted to become more frequent, more intense and longer in duration. Heat exposure exacerbates many common health conditions, including cardiac, respiratory, and kidney diseases. It is important to monitor residents for heat-related illness and symptoms. High temperatures can also exacerbate heat-sensitive conditions.

Heat-related illness

Our body regulates internal temperature to 37°C by vasodilation to improve heat transfer from muscles to skin, and by sweating which removes body heat. The brain also regulates these heat loss responses.

Age-related changes can reduce sweating response to hot weather, and some older people may not drink sufficient water to remain hydrated.

Some conditions can result as a direct result of excessive heat. These include:

- Heat rash
- Heat cramps
- Heat exhaustion
- Heat stroke
- Exertional heatstroke

Heat rash occurs when sweat is trapped in the skin and may present as an erythematous papular rash, pruritis or secondary infection. The mildest form of heat rash is called miliaria crystallina. It occurs when the opening of the sweat duct on the surface of the skin is blocked. Miliaria rubra or prickly heat occurs deeper in the skin, and presents with symptoms of small, inflamed blister-like bumps and itching or prickling. Heat rash usually heals by cooling the skin.

Heat exhaustion is a serious condition that can develop into heat stroke. Warning signs may include a pale complexion and sweating, rapid heart rate, muscle cramps and weakness, dizziness and headache, nausea, vomiting or fainting.

Heat stroke occurs when core body temperature rises above 40.5°C, leading to confusion and impaired consciousness. Dry skin with no sweating may occur. It can be fatal if treatment is delayed.

Excessive sweat production can lead to dehydration, which can lead to decreased blood volume and acute kidney injury. Many conditions may be precipitated or worsened by dehydration including:

- Altered mental state
- Cardiovascular impairment
- Electrolyte disturbances
- Renal impairment
- Falls
- Mental health conditions

Use of alcohol is associated with increased mortality during heat extremes.

For people with existing heart conditions, the body's response to heat stress in making the heart work harder and faster can lead to cardiovascular events.

Signs and symptoms

Signs and symptoms of heat stress to watch out for include headache, fatigue, nausea or vomiting, syncope, dizziness, flushed skin and altered mental state. Altered mental state can manifest as behavioural changes, confusion, delirium, dizziness, weakness, agitation, combativeness, slurred speech, nausea and vomiting.

Muscle cramps can occur in arms and legs due to loss of salt from excessive sweating which affects muscle relaxation.

Seizures and sphincter incontinence may occur in severe cases.

Medication causes

Some medications can increase the risk of heat-related illness by affecting sweating, dehydration and thermoregulation.

Medications that reduce sweating include:

- Anticholinergics – tricyclic antidepressants (TCAs)
- Anticholinergics – sedating antihistamines
- Anticholinergics – phenothiazine antipsychotics
- Beta-blockers e.g. atenolol, metoprolol, propranolol

Anticholinergics are commonly used to treat many conditions often seen in older people, including urinary incontinence, overactive bladder, allergies and Parkinson's disease. Anticholinergics interfere with sweating and the body's internal thermostat. Other medications with anticholinergic effects include benztropine, clozapine, olanzapine, quetiapine, oxybutynin and solifenacin.

Antipsychotics including clozapine, olanzapine, quetiapine, and risperidone can also increase heat production.

Beta-blockers can decrease blood flow to the skin, which can inhibit sweating. ACE inhibitors and angiotensin receptor blockers (ARBs) may cause dehydration and reduced renal function due to electrolyte disturbances or the risk of drug toxicity.

Over-diuresis with diuretics such as furosemide, hydrochlorothiazide may lead to dehydration. Combinations of medications that increase the risk of heat-related illness e.g. a diuretic and an ACE inhibitor, may cause significant problems due to additive effects. Inappropriate or overuse of stimulant laxatives such as senna extract and bisacodyl can also lead to dehydration. Dehydration can lead to toxic effects for some commonly used medications including digoxin, lithium, metformin and warfarin.

Antihypertensives (e.g. ACE inhibitors), antipsychotics and diuretics may reduce thirst sensation.

All hypertensives particularly vasodilators such as nitrates (glyceryl trinitrate, isosorbide mononitrate) and calcium channel blockers (amlodipine, felodipine, nifedipine) may aggravate heat illness by worsening hypotension in at-risk patients.

Triptans such as sumatriptan and zolmitriptan used for migraine reduce dilation, increasing the risk of heat-related illness.

Medication management

Whilst diuretics play a key role in the management of heart failure and fluid overload, it is important doses are reduced when patients are euvoelaemic. Once this has been achieved the diuretic dose should be reduced to the lowest effective dose or potentially discontinued.

Sedating antihistamines such as promethazine (Phenergan), dexchlorpheniramine (Polaramine), and cyroheptadine (Periactin) are used for numerous allergic conditions including allergic rhinitis (hayfever), allergic conjunctivitis, and pruritus or urticaria (itchy skin). However, have significant anticholinergic effects leading to dry mouth, blurred vision, constipation, lowered seizure threshold and sedation; and should not be used in older people. Seizures and cardiac conduction abnormalities may occur with overdoses.

Newer antihistamine such as cetirizine, desloratadine, fexofenadine, loratadine and bilastine are preferred. Intranasal corticosteroids, alone or in combination with intranasal antihistamines are preferred first-line treatment for allergic rhinitis. Less sedating antihistamines are also the mainstay of treatment for chronic spontaneous urticaria.

Psychotropic medications (antidepressants, anxiolytic/hypnotics and antipsychotics) need to be carefully monitored and only used at the lowest effective dose for the shortest period of time. Antipsychotics are subject to mandatory reporting in residential aged care facilities.

Residents should minimise caffeine intake and avoid alcohol during extreme heat as it may lead to dehydration.

Antipyretics (paracetamol, ibuprofen) are not effective in reducing high body temperature caused by heat.

Storage of medications usually below 25 degrees and in the refrigerator is also important.

Summary

Older people are at increased risk of heat-related conditions. Many common chronic illnesses and conditions make people more at risk of negative effects of heat. Some medications can increase the risk of health-related illness. Residential Medication Management Reviews (RMMRs) can identify potential medication-related causes of health-related illness.

The Victorian Government has prepared a Residential aged care services heatwave ready resource.

References

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- Aust Prescr* 2018;41:42-5.
- N Engl J Med* 2022; 387:1404-1413.
- AMH Aged Care Companion* 2022.
- Residential aged care services heatwave ready resource*, 2013.

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