Investigating weight loss in the elderly

In this series, we present authoritative advice on the investigation of a common clinical problem, specially commissioned for family doctors by the Board of Continuing Medical Education of the Royal Australasian College of Physicians.

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Weight loss in the elderly is common and usually associated with undernutrition. As many as 15% of community dwelling and home-bound elderly, 35 to 65% of hospitalised older adults and 50% of nursing home residents consume fewer than 1000 calories a day, an amount that does not maintain adequate nutrition. Half of all older adults have mineral and vitamin intakes less than the recommended daily intake (RDI), and 10 to 30% have subnormal levels of these. Undernutrition is often undiagnosed and undertreated,[1] and it is associated with several complications, including:

- increase in infections
- longer duration of hospitalisation
- increase in hospital complications
- higher rates of rehospitalisation
- higher morbidity
- increase use of health care services
- higher mortality.

Elderly patients should have their weight monitored and recorded regularly. One of the first clues of poor nutrition in the elderly is unexplained weight loss. Significant unintentional weight loss is a crude marker of the degree of malnutrition and should ring alarm bells that further assessment is required. Factors affecting weight loss include caloric intake, level of physical activity and basal metabolic rate.

Protein–energy undernutrition

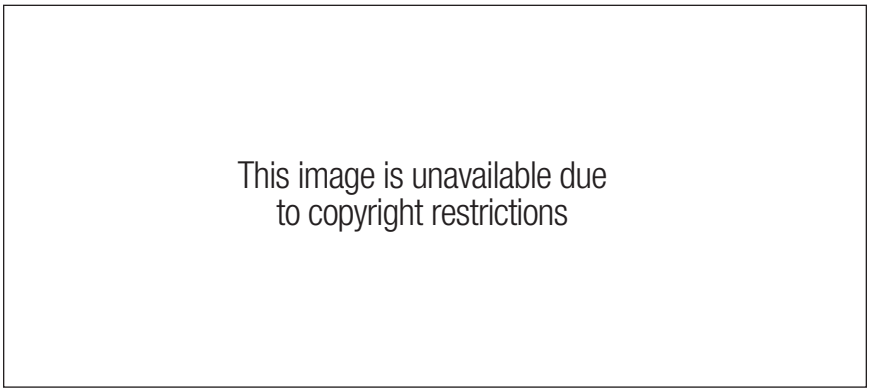
Unintentional weight loss is significant when there is a progressive decrease of more than 5% body weight in a six- to 12-month period. Protein–energy undernutrition is present with loss of 10% body weight in a six-month period, or greater than 5% weight loss in 30 days.

In cases of protein–energy undernutrition there are signs of wasting, low body mass index (BMI; defined as weight in kilograms divided by height in metres squared) and biochemical abnormalities providing evidence of insufficient oral intake. A BMI of:

- 22 to 27 kg/m^2 suggests good nutritional state (the BMI range is shifted upwards in older people because the ratio of fat to muscle is higher in this age group)
- less than 17 kg/m^2 is diagnostic of undernutrition

IN SUMMARY

- **Weight loss of more than 5% body weight in six months in the elderly is significant and suggests undernutrition.**
- **Measure weight routinely.**
- **Confirm that weight loss is occurring by recording and monitoring a patient's weight.**
- **Look for low serum albumin and/or prealbumin levels.**
- **Consider depression, dementia, and drug interactions as potential causes of weight loss.**
- **Perform a full assessment and work-up of the patient to determine the cause of weight loss.**
- **For nonmedical causes of weight loss, consider referring patients to a dietitian, speech pathologist or dentist.**



GETTY IMAGES

Table 1. Factors leading to inadequate nutrient intake

- Decreased appetite
- Decreased thirst
- Early satiety
- Dental problems
- Dysphagia
- Poverty
- Isolation
- Lack of transport
- Unavailability of preferred foods
- Lack of cooking skills
- Medications
- Medical illness
- Depression
- Dementia

- 17 to 20 kg/m^2 is suggestive of protein–energy undernutrition.

A change in BMI through unintentional weight loss is significant at any level, including a BMI of greater than 22 kg/m^2.

Loss of lean body mass

Ageing is associated with a reduction in skeletal and smooth muscle, and therefore a 10 to 20% decrease in basal metabolic rate in advanced age. The loss of lean body mass is associated with a reduction in total body water. Total body fat increases and bone density decreases.

A hypermetabolic, catabolic state can occur in response to illness, injury or infection. The more severe the insult, the more severe is the body's response. Acute illness may be associated with a marked increase in energy demands and change in nutrient use, with an increase in protein breakdown to meet energy needs. An energy deficit is common, and the increased use of protein rapidly depletes lean body mass, resulting in decreased strength and sarcopenia.

It is loss of protein, not fat, that leads to the complications of malnutrition. Protein synthesis is essential for tissue repair. During metabolic stress, the RDI of protein should be increased from 0.8 g/kg body weight to 1 to 1.5 g/kg.

Undernutrition: predictors of complications

The most commonly used threshold to define protein–energy undernutrition has been an albumin level of less than 35 mmol/L (normal: 40 to 50 mmol/L). However, it has been suggested that persons with hypoalbuminaemia of 35 to 38 mmol/L should be included (representing about 8% of the general population).

Serum albumin is one of the best predictors of morbidity and mortality among the aged.[2] Hypoalbuminaemia reflects depletion of visceral protein stores. Severe protein–energy undernutrition is associated with albumin of less than 28 mmol/L.

Despite a half-life of 21 days, albumin levels need to be interpreted within the clinical context. An acute illness or severe infection can lower albumin suddenly by cytokine release, inhibiting albumin production and causing albumin to move from the blood into the extravascular space. Albumin is sensitive to changes in vascular volume.

Levels of transport proteins with shorter half-lives, such as serum transferrin, prealbumin and retinol-binding protein, also decrease with increasing severity of undernutrition. Prealbumin, for example, may be more useful in diagnosing undernutrition in acute illness than serum albumin.

Total lymphocyte count also falls with increasing severity of undernutrition. Low cholesterol levels (less than 4 mmol/L) have been shown to be a predictor of increased mortality.

Other age-related changes affecting nutrition

Ageing is associated with atrophy of taste buds, resulting in decreased taste sensation. There tends to be a reduction in ability to detect odours and to identify foods that have been eaten. Older persons exhibit less hunger and earlier satiety. They often find it difficult to increase food intake appropriately in response to a period of anorexia.

Decrease in activity can reduce caloric requirements. Energy requirements decrease from 2700 calories at age 30 years to 2100 calories at age 80. Two-thirds of this decrease is due to decreased energy expenditure and one-third to a reduction in the metabolic rate.

Look for a cause

When a patient has been identified as having unintentional weight loss, the next step is to look for an identifiable and potentially treatable cause. Weight loss can result from:

- inadequate intake to meet normal needs
- increased nutrient requirements
- increased nutrient losses
- poor nutrient absorption.

The cause of weight loss can usually be identified, but in about 25% of cases no major cause may be found. Examples of factors that can lead to inadequate nutrient intake are listed in Table 1. Table 2 summarises some of the medical causes of weight loss. Malignancy is not a major cause of weight loss in the elderly in the absence of localising symptoms or signs.

A wide range of medications has been implicated in weight loss (Table 3). Adverse drug reactions likely to affect nutrition include nausea, vomiting and diarrhoea. Patients with undernutrition and hypoalbuminaemia are at increased risk of any adverse event when prescribed highly protein bound drugs (for example, digoxin, benzodiazepines, carbamazepine and phenytoin). Anticholinergic medications – e.g. oxybutynin or propantheline – can cause a dry mouth and be associated with impaired swallowing and deteriorating dentition.

Initial assessment of weight loss

A number of nutritional screening tools (e.g. the Mini-Nutritional Assessment), with varying degrees of sensitivity and specificity, have been published to help identify patients at risk from under-nutrition. However, the best single factor for predicting persons at risk of undernutrition is weight loss.

Evaluation of unintentional weight loss requires a comprehensive assessment of the patient and often a multidisciplinary approach with input from a speech pathologist, dietitian and dentist. Without documented weight measurements it can be difficult to assess the severity of the problem. Elderly patients should have their weight monitored and recorded regularly. Up to 50% of patients who claim significant weight loss have no actual change in weight when measured. Other patients may be unaware that sustained significant weight loss has occurred. Often a change in clothing size is a useful clue to significant weight loss.

History

It is important to take a dietary history. Is the patient eating three adequate meals a day? A dietitian can assist in assessing adequate nutrition.

Clues in the history may be changes in taste or smell, anorexia, vomiting or nausea, ill-fitting dentures, difficulty chewing food, swallowing problems, reflux, abdominal pain, altered bowel habits, alcohol intake and smoking history. Other contributing factors to poor nutrition include a history of dyspnoea or cough on eating, change in mental state, mood, paranoia or mania. Loneliness, social isolation, impaired mobility and change in financial circumstances may be relevant. It may be useful to ascertain whether a spouse who has been responsible for cooking is no longer able to undertake this role. Patients needing help with self-care are at risk.

Factors influencing intake, in addition to those listed in Table 1, may include changes to the foods that the patient likes or are culturally appropriate, food consistency and temperature at which it is served. In a nursing home setting, for example, restriction of salt, fat and sweets may make food unpalatable and lead to reduced intake without significantly helping the clinical status of the resident.

Studies show that women eat more (13% more) when men are present, and both men and women eat more (23%) with family present. Meals eaten in groups tend to be up to 44% larger than those eaten alone. Larger meals tend to be eaten on weekends and later in the day.[3]

Excess alcohol intake is also associated with weight loss.

It is important to include a detailed medication history (Table 3). Drug interactions are more likely in the presence of polypharmacy.

Unexplained weight loss may be a clue to possible elder abuse or neglect in a home.

Anorexia nervosa may recur in elderly

Table 2. Medical causes of weight loss

Increased metabolism
Hypermetabolic disorders: hyperthyroidism, phaeochromocytoma
Increased catabolic states: malignancy, COPD, severe cardiac failure (cardiac cachexia), chronic infection (e.g. subacute bacterial endocarditis, tuberculosis, HIV)

Anorexia and/or nausea
Abdominal ischaemia, hypercalcaemia, cholelithiasis, depression, peptic ulcer disease, uraemia, constipation, alcohol dependence

Dysphagia
Stroke, oral candidiasis, gastro-oesophageal reflux, connective tissue disorders, Parkinson's disease

Malabsorption
Gluten enteropathy, lactose intolerance, small bowel bacterial overgrowth, atrophic gastritis, chronic pancreatitis, dysmotility (e.g. gastroparesis in diabetes), inflammatory bowel disease, *Clostridium difficile*-induced diarrhoea (secondary to antibiotic use)

Table 3. Some medications implicated in weight loss

- Antibiotics
- Digoxin
- NSAIDs
- Selective serotonin reuptake inhibitors
- Metformin
- Levodopa
- ACE inhibitors
- Narcotic analgesics
- Potassium
- Colchicine
- Frusemide
- Antineoplastic drugs
- Anticholinergic drugs
- Antipsychotic drugs

persons who have had an episode in their teens (referred to as anorexia tardive).

Physical examination

The physical examination should focus on:

- vital signs
- skin (looking for pallor or jaundice)
- oral cavity (thrush, dentition, glossitis)
- thyroid
- lymph glands
- cardiovascular and respiratory signs
- abdomen (organomegaly)
- rectal examination
- breast
- cognitive screen (e.g. clock drawing or Mini Mental State Examination)
- depression assessment (e.g. Geriatric Depression Scale).

The physical examination may detect loss of subcutaneous fat as evidenced by loose skin on the extremities. The best muscles to examine for muscle wasting are the quadriceps femoris and deltoids. Quadriceps weakness may present as difficulty walking down stairs or rising from a chair.

Look for peripheral oedema in the absence of recognised cardiac disease or circulatory disorder and poor healing of chronic wounds or pressure sores.

Anthropometric measures such as triceps skinfold thickness and mid-arm circumference tend to be unreliable in the elderly. Their use is limited by the need for specialised calipers, experience of the observer and potential confounding effects of oedema or dehydration.

If swallowing problems are suspected, patients who cough, become breathless or develop wheeze following eating or a sip of water should be assessed for aspiration. In this case, refer the patient to a speech pathologist or consider a modified barium swallow test.

Investigations for weight loss

The following investigations can be used to investigate the cause of weight loss:

- serum albumin level
- full blood count and differential, erythrocyte sedimentation rate, C-reactive protein level
- electrolytes (including calcium), urea, creatinine, and blood sugar levels, and liver function tests
- thyroid function tests
- iron studies, and vitamin B_{12}, folate, parathyroid hormone, and vitamin D levels
- faecal occult blood testing
- urinalysis
- chest x-ray
- modified barium swallow.

More detailed assessment

The need for gastroenterologist referral and further investigations (e.g. endoscopy,

colonoscopy and abdominal CT scan) will depend on the patient's symptoms and clinical findings.

Low serum folate and vitamin D levels are found in patients with coeliac disease; consider tests for antigliadin and anti-endomysial antibodies to confirm this.

If malabsorption is suspected, faecal fat levels should be determined and D-xylose or hydrogen breath tests considered.

Small bowel bacterial overgrowth is common in the elderly, with a prevalence of about 15% in those over 75 years. Prolonged suppression of gastric acid production with H_2-receptor antagonists or proton pump inhibitors leads to bacterial overgrowth in the small intestine.[4]

Although malignancy is not a major cause of weight loss in the elderly without localising symptoms or signs, it can occur – e.g. cancer of the pancreas. The presence of thrombocytosis may suggest underlying iron deficiency or visceral cancer.

Cardiac cachexia is a frequent complication of severe congestive cardiac failure. Mesenteric ischaemia is uncommon. Such patients have increased metabolic demand and decreased appetite and oral intake. Inadequate blood flow to the gut postprandially may precipitate abdominal discomfort.

Patients with severe chronic airflow limitation can have increase in metabolic demand due to increased use of respiratory accessory muscles. Dyspnoea, aerophagia and medications can lead to anorexia, early satiety, bloating and dyspepsia. In such cases, weight loss is usually gradual, over years rather than months.

Patients with dementia often forget to eat. In addition, those who wander can burn off a large amount of energy in a day.

Depression is the most common reversible cause of weight loss in elderly people, occurring in up to 30% of all medical outpatients presenting with undernutrition.[5]

Conclusion

Weight loss in the elderly is common and often associated with undernutrition, which can lead to a reduced quality of life. Regular weight monitoring will improve early detection and assist in appropriate assessment. Once medical causes of weight loss have been either identified or excluded, referral of the patient to a dietitian or other health professional is recommended. MT

A list of references is available on request to the editorial office.

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