EDITORIAL

DEFINING UNDERNUTRITION (MALNUTRITION) IN OLDER PERSONS

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The Four major parenteral and enteral nutrition societies, viz Europe (ESPEN), USA (ASPEN), Asia (PENSA) and Latin America (FELANPE), are attempting to develop a global consensus on diagnostic criteria for malnutrition (1). This has been driven to some extent by the fact that confusion exists among dietitians and other health professionals regarding the use of terminology such as malnutrition, starvation, cachexia and sarcopenia (2). The World Health Organization defines malnutrition as deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. They identify two broad groups of malnutrition, the one being undernutrition and the other being over nutrition (www.who.int/features/qu/malnutrition/en/; accessed October 20, 2017). Unfortunately, the ESPEN guidelines while recognizing that malnutrition is a broader concept, also uses it to describe undernutrition (which they recognize as a synonym) (3). One hopes that as these guidelines develop they will use either undernutrition alone or protein energy malnutrition to identify nutrition problems associated with loss of weight.

The next problem is that the criteria for diagnosing malnutrition as being reduced body mass index (BMI) (<18.5 kg/cm²) or weight loss and reduced BMI or loss of free fat mass. The problem with this definition is it fails to distinguish it from loss of body parts (amputation) or from cachexia. The ASPEN malnutrition criteria requires any 2 of low energy intake, weight loss, loss of muscle mass, loss of subcutaneous fat mass, fluid accumulation on hand grip strength (4). This definition has the same problems as the ESPEN criteria but also would include persons with age-related sarcopenia (loss of muscle mass and low handgrip strength). Thus, we would argue that the societies should use the weight loss ($>5\%$ in 6 months) that does not occur in the situation where the person is not undergoing appropriate therapeutic dieting as an umbrella term for undernutrition and cachexia (Figure 1). While weight loss leads to the loss of muscle mass leading to sarcopenia, most persons with sarcopenia do not have excess weight loss as muscle loss is replaced by fat (5-8). Both weight loss and sarcopenia are major causes of the physical phenotype of frailty, but frailty should be considered a secondary nutritional condition (9-16).

Undernutrition can be considered to be a condition in which inadequate calories are being delivered to the portal blood system, which is correctable either by correcting the cause or providing enteral or parental nutritional support. The major cause of undernutrition remains worldwide to be unavailability

of an adequate food supply leading to starvation (marasmus) (17). Inappropriate dieting as occurs in anorexia nervosa and in older persons who excessively calorically restrict leads to loss of muscle and bone and is another obvious cause of undernutrition. Intentional weight loss in older persons leads to loss of muscle and bone as well as increased circulating toxins and fatty acids which have been associated with early mortality (18-22). Many older persons develop an anorexia of aging (23-25). This can be aggravated by medications, depression, elder abuse, late life paranoia, swallowing problems, oral problems, nosocomial infections, e.g., *Helicobacter pylori*, dementia, endocrine disorders (e.g., Addison's disease, hypercalcemia), delayed stomach emptying, diabetes mellitus, therapeutic diets, low grade inflammation associated with arthritis and excess adipose tissue and dyspnea associated with hypoxia when eating in persons with COPD (26-30).

Figure 1
Causes and Outcome of Weight Loss in Older Persons

Numerous mechanical problems with feeding occur in older persons. These include tremors in Parkinson's disease, functional impairment, dysphagia and dementia. Inability of persons with dementia to remember to eat is a not uncommon cause of weight loss (31). Feeding a person with dementia can take up to 40 minutes a meal (32). Persons with Parkinson's disease may benefit from a computer regulated stabilizing spoon (www.liftware.com). Dysphagia is an interesting example of a mechanical problem (33-35). Dysphagia leads to a decrease in food intake and through aspiration pneumonia an increase in inflammatory cytokines. Increased inflammatory cytokines lead both to anorexia but also to muscle mass loss leading to sarcopenia (Figure 2) (36-38).

Figure 2

Mechanisms by which Dysphagia Causes Undernutrition and Sarcopenia

Finally malabsorption, such as gluten enteropathy and pancreatic insufficiency, are not rare in older persons resulting in undernutrition (39).

When persons are at risk for undernutrition they should be administered validated nutritional screening tools. The Simplified Nutritional Appetite Questionnaire (SNAQ) has been shown to be an excellent tool to identify persons at risk of weight loss (40-43). The MiniNutritional Assessment MNA) and its short form have been well validated for use in older populations to identify those at risk (44-49). However, it needs to be recognized that the MNA also is likely to identify persons at risk for frailty (50). Other screening tools that are commonly used are the Nutrition Risk Screening 2002 and the Malnutrition Universal Screening Tool (MUST) (51, 52). Albumin and prealbumin should not be used as nutritional screening tools (53).

Whether or not cachexia should be considered a nutritional disorder remains open for discussion. While undernutrition can, for the most part, be reversed with nutrition, it is much less clear what the role of nutrition is during the cachexia process (54). Cachexia is defined as a loss of lean mass due to inflammatory cytokines (55, 56). It also has anorexia, anemia, and low albumin (57). Persons with cachexia have a loss of muscle out of proportion to fat loss. The loss of albumin is due mainly to third spacing secondary to inflammation and not due to poor intake. Kwasiorkor occurs in starving children when they become infected (55). In the “Society of Sarcopenia, Cachexia and Wasting Disorders” guidelines it is specifically stated that “cachexia is often incorrectly perceived as malnutrition” (56). Diagnosis of cachexia can be made when weight loss is accompanied by a CRP level >5 mg/L (58). Overall, the treatment of cachexia is the treatment of the underlying disease. Exercise and protein supplementation may play a role in preserving muscle mass and improving quality of life during the treatment of the underlying disease.

In conclusion, early recognition of anorexia and subsequent

weight loss is important in the care of older persons. Undernutrition is an important cause of sarcopenia and frailty in older persons, suggesting that they should be screened for at the same time as using validated nutritional risk screening tools. The Rapid Geriatric Assessment (RGA) tool is a rapid method by which this can be done (59). There are numerous treatable causes of weight loss in older persons and these can be recognized using the “MEALS-ON-WHEELS” mnemonic (Table 1) (60). A CRP level should be obtained to rule out cachexia in person with rapid weight loss.

Table 1

MEALS-ON-WHEELS Mnemonic for Treatable Causes of Weight Loss in Older Persons

Medications (e.g., digoxin, theophylline, cimetidine)
Emotional (e.g., depression)
Alcoholism, elder abuse, anorexia nervosa
Late life paranoia
Swallowing problems
Oral factors
Nosocomial infections (e.g., tuberculosis)
Wandering and other dementia related factors
Hyperthyroidism, Hypercalcemia, Hypoadrenalism
Enteral problems (e.g., gluten enteropathy)
Eating problems
Low salt, low cholesterol and other therapeutic diets
Stones (cholecystitis)

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