

# Anorexia in Elderly

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## ABSTRACT

**Introduction:** Anorexia in elderly is an important geriatric syndrome. It is defined as the loss of appetite and/or decreased food intake in late life.

**Mechanism:** It is due to physical factors and chronic medical diseases. Delayed gastric emptying and colonic stasis also contribute to anorexia. Hormones like ghrelin and leptin as well as certain hypothalamic neurons like the nucleus arcuatus play an important role in its pathogenesis.

**Consequences of anorexia of aging:** Anorexia in elderly leads to malnutrition, frailty and sarcopenia resulting in increased mortality.

**Assessment:** It is assessed by the mini nutritional assessment and other tools.

**Treatment:** Anorexia in elderly is treated by food manipulation and nutritional supplementation, although there is no effective agent.

**Conclusion:** Anorexia of aging is an important challenge to the treating physician. An adequate amount of food must be ensured in the elderly to prevent weight loss particularly in the frail subjects.

**Keywords:** Anorexia, Frailty, Geriatric syndrome, Ghrelin, Malnutrition, Mini nutritional assessment, Nucleus arcuatus, Nutritional supplementation. *Bengal Physician Journal* (2019): 10.5005/jp-journals-10100-6104

## INTRODUCTION

The expression “geriatric syndrome” has been used to describe complex clinical conditions that are common in frail older persons and do not fit into specific disease or syndrome categories. Anorexia in elderly is an important geriatric syndrome. It is defined as the loss of appetite and/or decreased food intake in late life. The pathogenesis of anorexia of aging is a complex process. It is dependent upon a central feeding pathway that is restrained by peripheral satiation signals. Anorexia leads to malnutrition in the elderly, which is one of the greatest threats to health, well-being, and autonomy.<sup>1</sup> Undernutrition in the elderly is associated with an increased risk of mortality and morbidity, including frailty, pressure ulcers, impaired wound healing, dehydration, and functional decline.<sup>2</sup> Understanding why some elderly people eat less as they get older, to the point where they experience unhealthy weight loss and protein-energy malnutrition (PEM) will help healthcare providers learn how to assess for risk factors associated with anorexia of aging.<sup>2</sup>

In developed countries, approximately 85% of long-term care (LTC) residents, between 23% and 62% of hospitalized elderly patients, and 15% of community-dwelling older adults suffer from malnutrition.<sup>2</sup>

## RISK FACTORS FOR ANOREXIA OF AGING

### Physical Factors

Anorexia in elderly is related to physical impairment because mobility problems can interfere with cooking, procuring food, and eating on one's own. Loss of vision and hearing leads to inability to shop and eat food. Mouth conditions, poor dentition, or ill-fitting dentures can make chewing difficult. Elderly often have periodontal disease, and many are toothless.<sup>2</sup> Dysphagia may also occur due to gastrointestinal or neurologic disease, limiting food intake.

### Medical Factors

Chronic medical problems may reduce the appetite or may interfere with eating. Chronic obstructive pulmonary disease (COPD),

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Parkinson's disease, arthritis, malabsorption syndrome, etc., all can lead to anorexia and unintentional weight loss. Psychological factors like depression, dementia, or Alzheimer's disease may lead to anorexia, or the elderly subject may forget to eat.

### Role of Smell and Taste

Elderly people with diminished senses of smell and taste suffer from anorexia. This may be due to chemosensory loss or may even be the result of chronic disease, medication use, and PEM.

Doty and colleagues found that >60% of study participants between 65 years and 80 years of age and >80% of participants ≥80 years had impaired taste and smell compared with taste and smell sensitivity among participants ≤50 years.<sup>3</sup>

### Medications

The elderly often take many drugs resulting in polypharmacy. Many of these drugs may cause anorexia, e.g., digoxin, furosemide, spironolactone, levodopa, proton pump inhibitors, metronidazole, chemotherapeutic agents, non-steroidal anti-inflammatory drugs (NSAIDs), and the like.

### Social Factors

Social isolation is an important causative factor for anorexia. Residents of LTC facilities are often presented with unpalatable and monotonous food apart from missing their usual friendly company resulting in anorexia.<sup>4</sup> Thus, loss of independence in LTC centers, particularly with regard to dining contributes to anorexia in elderly.

## MECHANISM

The following factors are implicated in the mechanism of anorexia in elderly:

### Role of Hormones

#### Ghrelin

Ghrelin is the “hunger hormone,” which stimulates hunger. It is released in a pulsatile fashion by ghrelin cells of the gastric mucosa. In the elderly, a concomitant increase in circulating leptin and insulin leads to lower sensitivity to ghrelin.<sup>5</sup>

Ghrelin also seems to regulate long-term energy balance. Hence, it rises in conditions of negative balance, e.g., Cachexia but is suppressed in obese subjects with a positive energy balance.

#### Cholecystokinin (CCK)

CCK is a “satiety hormone” released from the proximal small intestine in response to delivery of nutrients from the antrum, particularly lipids and proteins. High levels of CCK are probably among the major causes of the anorexia of aging as they were correlated to abnormally higher satiety sensations after meals.<sup>6</sup>

#### Peptide YY (PYY)

PYY is also released by the distal intestine in increased amounts in late postprandial phase in older persons, and it also hinders the desire for a second meal.

Both CCK and PYY convey important anorexigenic signals to the hypothalamus. They also mediate the slowing of gastric emptying induced by the presence of nutrients in the small intestine.<sup>7</sup>

#### Glucagon-like Peptide-1 (GLP-1)

GLP-1 is derived from glucagon metabolism. It is produced by the distal small intestine after food ingestion and carries a strong anorexigenic signal.

#### Leptin

Leptin is a hormone that also plays a role in the postprandial pathway of signals in the anorexia of aging. It is mainly produced by adipose cells; high leptin levels testify to the presence of adequate body fat and no need for further food intake and *vice versa*.<sup>8</sup> Serum leptin was found to be significantly high in the elderly sometime after a meal, hence it is more involved in long-term food control. Leptin and CCK collaborate to amplify the satiety level.

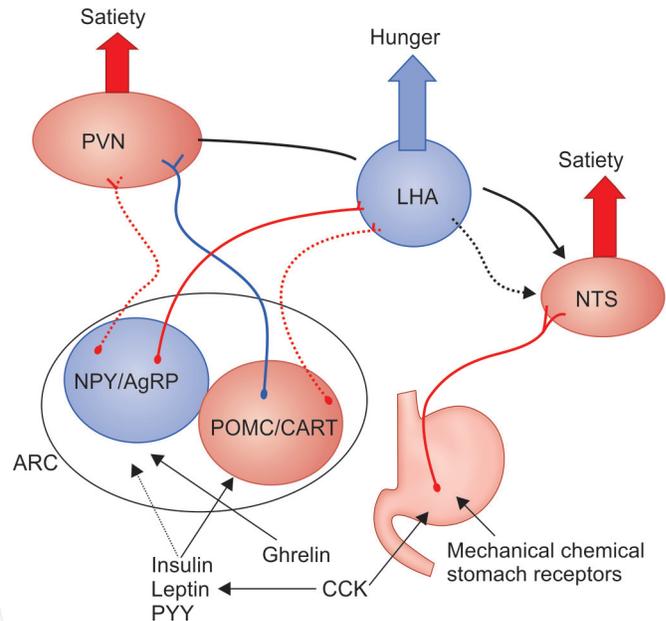
#### Insulin

Insulin acts as a satiety hormone. In elderly, an increase in fasting and postprandial plasma insulin concentrations enhances the anorexigenic signals of leptin to the hypothalamus and also hinders the ghrelin stimulus. Aging is characterized by reduced glucose tolerance and elevated insulinemia, which facilitates anorexia.<sup>9</sup>

### Central Hypothalamic Control of Hunger and Satiety (Fig. 1)

There are some hypothalamic neurons, which control hunger and satiety.

The nucleus arcuatus (ARC) has neurons that release neuropeptide Y (NPY) the most potent hunger mediator, and agouti-related peptide (AGRP) another hunger mediator. Axons from ARC neurons release NPY and AGRP in the paraventricular nucleus (PVN) referred to as “satiety center” and inhibit it. Other



**Fig. 1:** Role of hormones and hypothalamic neurons in anorexia in elderly. PVN, paraventricular nucleus; LHA, lateral hypothalamus area; NTS, nucleus tractus solitarius; NPY, neuropeptide Y; ARC, nucleus arcuatus; POMC, pro-opiomelanocortin; CART, cocaine—amphetamine related peptide; PYY, peptide YY; CCK, cholecystokinin

neural terminations from ARC reach the lateral hypothalamus area (LHA), known as the “hunger center” and stimulate it. The net effect is hunger stimulation and satiety inhibition leading to increased food intake.

Other neurons in the ARC express pro-opiomelanocortin (POMC), the precursor of melanocortins such as alpha-MSH that inhibit LHA and stimulate PVN. Another group of neurons with similar action express cocaine—amphetamine related peptide (CART). Both MSH and CART are inhibited by NPY neurons, resulting in hunger.<sup>8</sup>

#### Role of Nucleus Tractus Solitarius (NTS)

It receives impulses from the stretch receptors of the stomach along the vagal nerve after gastric filling by food. This results in satiety and checks excessive food ingestion. CCK also stimulates NTS and leads to satiety. NTS receives inhibitory fibers from LHA and excitatory fibers from PVN—leading to hunger in fasting conditions and satiety after meals.<sup>8</sup>

To sum up, leptin, insulin, CCK, PYY, and GLP-1 inhibit NPY/AGRP neurons and stimulate POMC, resulting in satiety.<sup>8</sup> On the contrary, ghrelin stimulates NPY neurons in the ARC, potentiates hunger, and triggers eating. NPY impairment may potentially be involved in the pathogenesis of anorexia of the elderly. It is also known that endocannabinoids stimulate hunger, and diminished endocannabinoid tone may cause anorexia in elderly.

### Peripheral Control of Energy Balance

#### Role of Smell and Taste

Difficulty in recognizing flavors may be the consequence of age-related modification of olfactory epithelium, receptors, and neural pathways, and this olfactory deficit leads to reduced appetite.<sup>10</sup> This has been discussed earlier.

### Delayed Gastric Emptying

Delayed stomach emptying or gastroparesis may cause prolonged postprandial satiety. Ultrasonographic antral dynamics demonstrated delayed gastric emptying in the elderly. This may be due to reduced digestive ability of the stomach, an “ileal brake” effect, age-related decline of gastric mobility, or even hypochlorhydria due to medications.<sup>6</sup> The increased level of circulating CCK, combined with higher sensitivity, may slow antral emptying.<sup>7</sup> Gastroparesis is also associated with type 2 diabetes mellitus, Parkinson's disease, etc.

### Role of Gallbladder

Altered gallbladder contractions have also been postulated in elderly persons. Postprandial gallbladder volume was inversely correlated with satiety.<sup>6</sup>

### Role of Intestine

Regarding intestinal motility colonic stasis delays gastric emptying by colon-gastric reflux, indirectly prolonging the sensation of satiety. Constipation is also a common problem in the elderly; it leads to impaired motility along the whole gastrointestinal tract and thereby leads to anorexia.

## CONSEQUENCES<sup>1</sup>

### Malnutrition

Anorexia in the elderly leads to PEM.

### Frailty and Sarcopenia

Reduced food intake causes muscle weakness resulting in physical disability as assessed by the short physical performance battery, handgrip strength, four-meter walk speed, and impaired activities of daily living (ADL) score. Ultimately frailty results.<sup>1</sup> Protein deficiency along with lack of leucine and vitamin D contributes to sarcopenia and frailty

### Mortality

It has been found that subjects with anorexia had a two-fold higher risk of death from all causes compared with subjects without anorexia.

## ASSESSMENT OF ANOREXIA OF AGING

Good screening tools are available for the assessment of anorexia of aging. The main emphasis is to assess the nutritional status. With the help of these tools, one can identify the elderly who are vulnerable to anorexia of aging so that remedial measures can be instituted.

Measuring height and weight is the best noninvasive way to assess nutritional status and allows BMI to be calculated. Volkert and colleagues identified a BMI of <22 kg/m<sup>2</sup> as indicative of malnutrition in adults aged ≥65 years.<sup>11</sup> Others have found higher mortality rates in elderly individuals with a BMI of <25 kg/m<sup>2</sup>. Other indications of nutritional status include overall appearance, condition of hair, nails, skin, oral health, and behavior such as degree of responsiveness or lethargy. Laboratory values such as serum albumin are also helpful.

Screening instruments validated are

- The mini nutritional assessment (MNA) is a validated, reliable instrument for assessment of nutrition in the elderly. The

approximately 15 minutes test contains 18 items, including height, weight, mobility, lifestyle, circumference of the arm and calf, weight loss during the previous three months, eating and drinking habits, medication use, presence of pressure ulcers, ability to feed oneself, and the patient's perception of his or her health and nutritional status. A score of 12–14 points indicates “normal nutritional status” and 0–7 points indicating a patient who is malnourished.<sup>12</sup>

- Another reliable assessment tool for malnutrition risk is the sadness, cholesterol, albumin, loss of weight, eating, and shopping (SCALES) test. It is useful for outpatient screening.
- The geriatric nutritional risk index (GNRI) is a new tool to evaluate the risk of nutrition-related problems. Combining the MNA with GNRI may be the best option to assess nutrition in the elderly.<sup>13</sup>

## TREATMENT

Anorexia of aging can be treated according to the following guidelines.

### Food Manipulation

Provision of palatable food with dietary variety and improved flavor will increase the food intake by up to 13–26%. Serving food with pleasant aromas, such as freshly baked bread, will also stimulate the appetite. Dietary restrictions must not be rigid in the elderly, particularly in those who are undernourished and losing weight. The diet for a resident with gastroparesis should be low in fat and fiber, which delay the transit of food through the stomach and contain soft foods in small portions.

### Assistance During Eating

Some workers have found that 33% of adults ≥65 years of age need assistance with activities of daily living, and caregivers may need to make eating easier for these patients by cutting food into bite-sized pieces, opening packets, removing bits, buttering bread and providing assistance with utensils.

Feeding tube may be an option for some patients, such as those with dementia or nearing the end of life, but the patient's preference must be respected.

### Environmental Adaptation

Older adults eat less when they are depressed. Hence, depression must be treated to prevent anorexia of aging. The elderly, particularly nursing home residents, are allowed to socialize. Family-style dinners have increased appetite, and they gained body weight with improved quality of life.<sup>14</sup>

### Medications

It has already been mentioned that certain drugs decrease appetite in the elderly. Anticholinergics and narcotics can slow down digestion and increase the risk of unintended weight loss. Digoxin and metformin can cause malabsorption. Many drugs and chemotherapeutic agents have adverse effects, which decrease energy intake. It may often be necessary to “change, stop or reduce the doses” of drugs associated with anorexia.

### Medical Diagnoses

Certain medical conditions in the elderly are associated with anorexia and weight loss. Swallowing disorders, dyspeptic conditions, malabsorption syndromes, stroke and other neurological causes of dysphagia, etc., can all predispose to anorexia of aging.

Congestive cardiac failure, chronic obstructive airway disease, and psychotic disorders can cause anorexia. Hence treatment of all these conditions is a must to treat anorexia in elderly.

### Nutritional Supplementation

Nutritional supplementation in the elderly improves calorie intake and reduces the risk of malnutrition. Some workers have found that providing nutrient-dense, protein-energy liquid supplements to frail elderly people improved their nutritional status. In fact, protein supplementation with at least 1.0–1.2 g protein per kg of body weight per day is required to reduce the loss of muscle mass and strength and prevent frailty. Further, vitamin D supplementation (800 IU) daily also reduces the risk of falls and fractures and improves muscle mass and strength.

### Specific Treatment

No effective agent is available to improve the appetite in old persons. Anabolic agents like oxandrolone, metoclopramide, megestrol, cyproheptadine, CCK antagonists like loxiglumide can all cause adverse effects. Hence all these agents are of limited benefit in clinical practice. Ghrelin and its analogs and the antidepressant drug mirtazapine have been found to increase appetite and weight gain, but more studies are required.

### CONCLUSION

Anorexia of aging is an important challenge to the treating physician. A suitable care plan has to be developed. Patients should undergo frequent monitoring, particularly with regard to body weight. Proper assessment is needed with the ultimate objective of ensuring an adequate amount of food in the elderly to prevent weight loss, particularly in the frail and institutionalized subjects.

### ANOREXIA IN ELDERLY TAKE-HOME MESSAGE

- Anorexia in elderly is an important geriatric syndrome.
- It is due to several risk factors like physical impairments, medical illnesses, loss of smell and taste, social deprivation, and effects of drugs.
- Several gut and other hormones, as well as hypothalamic neurons, are implicated in its pathogenesis. Impaired gastrointestinal motility, including delayed gastric emptying, are additional etiological factors.

- Anorexia in elderly leads to malnutrition and contributes to sarcopenia and frailty. It can be assessed by the MNA, the GNRI, and other tools.
- No effective agent is available to treat anorexia in elderly although ancillary measures may be useful.

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