Malnutrition in Gastrointestinal Disorders

Detection and Nutritional Assessment

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KEYWORDS

• Malnutrition • Gastrointestinal disorders • Subjective Global Assessment
• Macronutrient malnutrition • Nutritional assessment

KEY POINTS

- The detection and management of malnutrition in patients with gastrointestinal disease are important, and influence patient outcome and costs.
- Malnutrition occurs when net nutrient intakes does not meet the body's requirements.
- All patients with significant gastrointestinal disease should be clinically assessed for protein calorie malnutrition by using the Subjective Global Assessment.
- All patients should be have blood tests for anemia, electrolyte and micronutrient deficiency.
- Pateints with inflammatory bowel disease and malabsorption should have measurement of bone mineral deficiency an 25-OH vitamin D levels.

INTRODUCTION

In a recent study of 18 Canadian hospitals encompassing 1015 patients, of whom 30.4% had gastrointestinal disease, 45% were malnourished.[1] Malnutrition was related independently to a prolonged duration of hospital stay and the cost of hospital stay was 31% to 34% more than that of well-nourished patients.[2] Hence, the detection and management of malnutrition in patients with gastrointestinal disease are important and influence the outcome and costs.

Nutritional health requires the intake and absorption of protein, lipids, and carbohydrate that, together, maintain the structure and meet the energy requirements of tissues. They are referred to as macronutrients. In addition, relatively small to minute amounts of other substances are required for the function of tissues and protection

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from infection. They are collectively referred to as micronutrients and are composed of electrolytes, vitamins, and trace elements.

MACRONUTRIENT MALNUTRITION

Malnutrition occurs when net nutrient intake (nutrient intake corrected for absorption and for abnormally large fecal or urinary losses) is less than requirements. Recently, the following definition has been given: "Malnutrition includes both the deficiency or excess (or imbalance) of energy, protein and other nutrients. In practice, undernutrition or inadequate intake of energy, protein and nutrients is the focus."[3] The phenotype of progressive macronutrient malnutrition is loss of body mass and weakness. In patients with gastrointestinal disease, malnutrition owing to lack of nutrients interacts with 2 other factors that also cause the same phenotype, namely, body wasting and weakness. These factors are concurrent disease (usually inflammatory or cancer) and the effects of aging.

Protein–Energy Deficit

Malnutrition owing to lack of macronutrients, namely, protein, carbohydrates, and fats, leads to a depletion of liver glycogen, followed by the use of body fat to meet energy requirements in an effort to preserve muscle and essential organs (Fig. 1A). With pure protein–energy malnutrition, blood count, electrolytes, and plasma protein levels are maintained at normal levels. Once body fat is depleted, muscle is catabolized for energy and, ultimately, extreme weakness and death occurs.

Disease-Induced Body Wasting: Cachexia

Disease-induced wasting and fatigue, which is called cachexia, can be a feature of infection, sepsis, cancer, heart failure, systemic inflammatory disorders, and chronic pulmonary disease (Fig. 1B). A consensus document on cachexia has pointed out that the term malnutrition has often been used to describe cachexia and should be avoided because cachexia "cannot be successfully treated with nutrition alone." A major difference between an imbalance of protein–energy status and cachexia is the early and profound loss of muscle mass seen with cachexia.[4] In contrast, muscle loss is a late manifestation of protein–energy imbalance. Cachexia with profound muscle loss may be associated with increased body fat called cachectic obesity. In a recent systematic literature review, the authors pointed out that the analysis was clouded by the variety of definitions used to include patients defined as being cachectic. This review pointed out that cachexia does not respond to nutritional support and there is a negative protein energy balance owing to both reduced intake and abnormal metabolism, leading to progressive functional impairment.[5] The recognition of cachexia is based on weight loss of at least 5% body weight or body mass index (BMI) of less than 20 kg/m^2 in the absence of simple starvation and the presence of 3 of the following 5 criteria.[4]

1. Decreased muscle strength.
2. Fatigue.
3. Anorexia.
4. Low fat-free mass index (<7.26 kg/m^2 in men and <5.45 kg/m^2 in women).
5. Abnormal biochemistry including increased C-reactive protein, reduced albumin, and anemia.

In addition, reduced muscle function disproportionate to loss of muscle mass occurs and causes profound weakness. In contrast, pure imbalance of protein–energy does not cause early fatigue. For example, anorexic patients are hyperactive and rarely fatigued.