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New Guidelines for Assessment of Malnutrition in Adults: Obese Clinically Ill Patients

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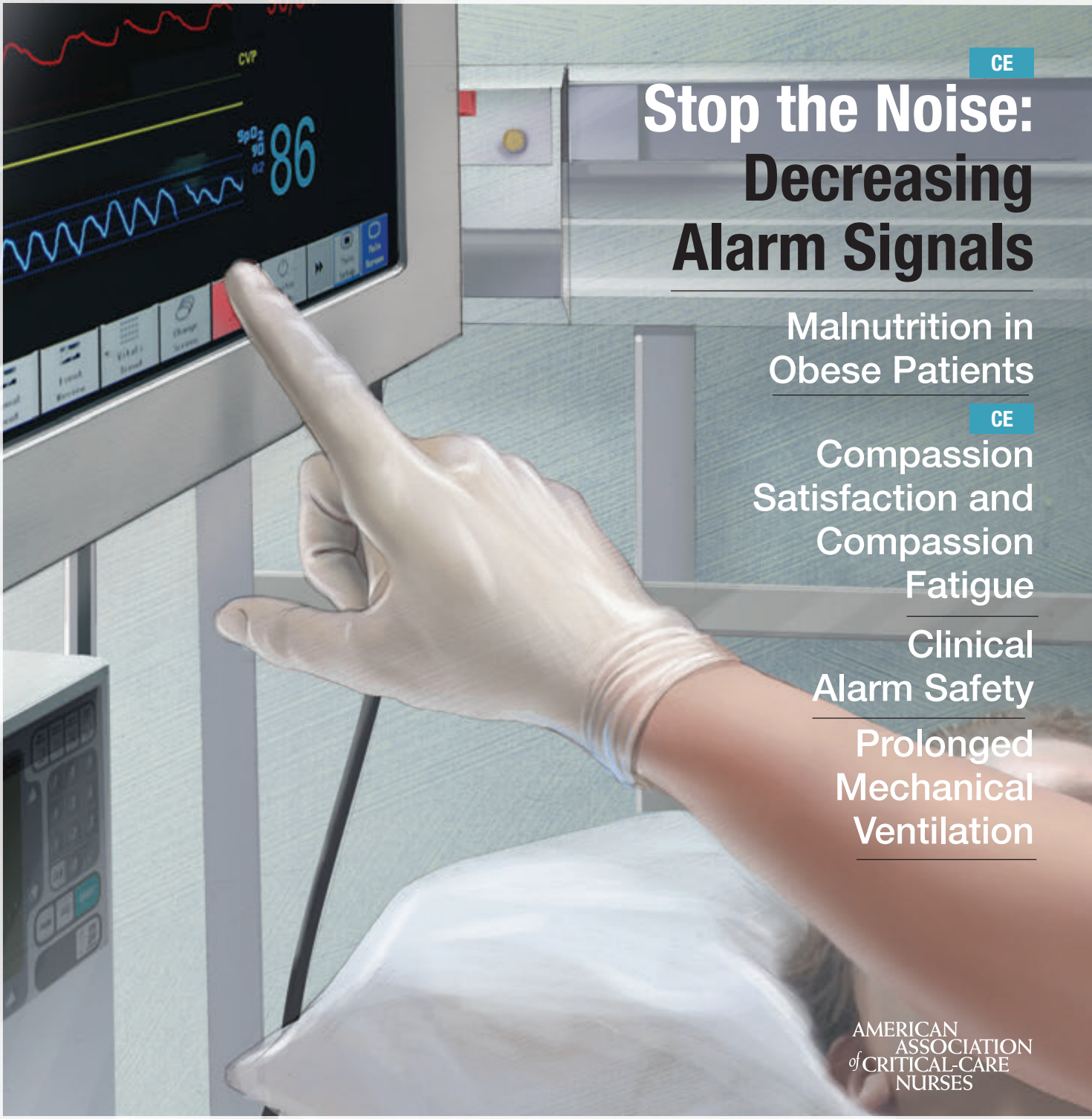

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Malnutrition in Obese Patients

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Compassion Satisfaction and Compassion Fatigue

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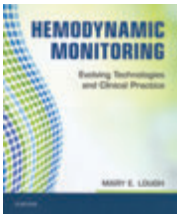

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New Guidelines for Assessment of Malnutrition in Adults: Obese Critically Ill Patients

Kasuen Mauldin, PhD, RD
Colleen O'Leary-Kelley, RN, PhD

Recently released recommendations for detection and documentation of malnutrition in adults in clinical practice define 3 types of malnutrition: starvation related, acute disease or injury related, and chronic disease related. The first 2 are more easily recognized, but the third may be more often unnoticed, particularly in obese patients. Critical care patients tend to be at high risk for malnutrition and thus require a thorough nutritional assessment. Compared with patients of earlier times, intensive care unit patients today tend to be older, have more complex medical and comorbid conditions, and often are obese. Missed or delayed detection of malnutrition in these patients may contribute to increases in hospital morbidity and longer hospital stays. Critical care nurses are in a prime position to screen patients at risk for malnutrition and to work with members of the interprofessional team in implementing nutritional intervention plans. (*Critical Care Nurse*. 2015;35[4]:24-31)

Depending on the population of patients and the criteria used for detection, 15% to 60% of patients have some degree of malnutrition when they are admitted to the hospital.[1-4] Patients in the intensive care unit (ICU) are more likely than other patients to be malnourished or at high risk for malnutrition. Malnutrition in critically ill patients is associated with increased hospital morbidity and mortality, increased risk for infections, compromised immune status, poor wound healing, and extended hospital lengths of stay.[4-7]

In the United States, the Joint Commission on Accreditation of Healthcare Organizations[8] mandates that every patient have a nutritional screening within 24 hours of admission to an acute care center. The purpose of the screening is to detect patients who are already malnourished or at nutritional risk so the patients can receive early nutritional intervention. Despite the availability of malnutrition screening tools,[9] such as the Nutritional Risk Screening (NRS-2002) instrument,[10] malnutrition continues to be underrecognized.[11-13] Multiple definitions for malnutrition can be found, and no standards exist for

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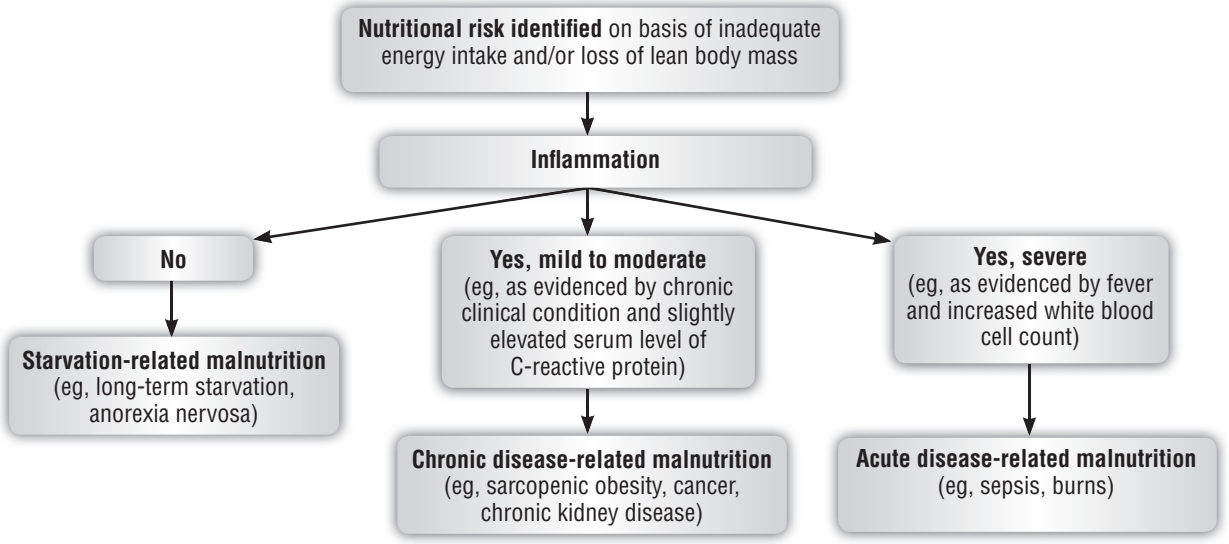

Figure Etiology-based definition of malnutrition risk, incorporating the role of inflammation in disease-related malnutrition.

Modified from Jensen et al.[18] ©2013 by Sage Publications Inc. Reprinted by permission of Sage Publications.

standardization in documenting malnutrition nutritional information. In response, the Academy of Nutrition and Dietetics and the American Society for Parenteral and Enteral Nutrition jointly released a consensus statement in 2012 outlining recommendations for the detection and documentation of malnutrition in adults.[14,15] The statement proposes an etiology-based approach in defining malnutrition that takes into account the role of inflammation.[16,17] Understanding these current definitions of malnutrition will help critical care nurses recognize the different types of malnutrition syndromes, particularly chronic disease-related malnutrition common in obese critically ill patients.

Appropriate recognition of malnutrition requires knowledge of nutritional assessment methods. Nutritional assessment is the first step in nutritional care, a continual process that includes a diagnosis, intervention, monitoring, evaluation, and periodic reassessment.[2] A nutritional assessment involves gathering information that will provide the evidence for the diagnosis as well as the basis for planning the intervention. In the ICU, critical care nurses have great influence on patients' outcomes because nurses spend more time at the bedside with patients than does any other health care provider. Critical care nurses and all members of the health care team should have current knowledge of the new guidelines released by the Academy of Nutrition and Dietetics and the American Society for Parenteral and Enteral Nutrition.[14,15] A systematic, interprofessional team approach to nutritional assessment will prevent delays and oversights in diagnosing and managing malnutrition.

New Guidelines

The 3 etiology-based definitions of malnutrition (see Figure) in the new guidelines are starvation-related malnutrition without inflammation, chronic disease-related malnutrition with mild to moderate inflammation, and acute disease- or injury-related malnutrition with marked inflammation. These definitions take into consideration that inflammation (whether chronic or acute) is an underlying factor in the pathogenesis of metabolic alterations associated with malnutrition in disease or injury states.[19]

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Table 1 Information used in assessment and documentation of malnutrition[a]

Data to be collected for documenting insufficient energy intake

Comparison of energy intake vs estimated energy expenditure
Hourly documentation of nutritional support
- Type of nutritional support, feeding rate, volume

Estimated nutrient needs
- Estimated resting energy expenditure determined by using indirect calorimetry or predictive equations (and multiplying by appropriate injury factors)
- Estimated protein needs (appropriate range based on clinical state)
- Estimated fluid needs

Data to be collected for documenting weight loss, loss of muscle mass, loss of subcutaneous fat, and/or fluid accumulation that may sometimes mask weight loss

Height
Current weight (consider in context of dehydration or fluid accumulation if applicable)
Body mass index (BMI, calculated as weight in kilograms divided by height in meters squared) calculation and classifications[20]
- BMI <18.5, underweight
- BMI 18.5-24.9, normal
- BMI 25.0-29.9, overweight
- BMI 30.0-34.9, obesity class I
- BMI 35.0-39.9, obesity class II
- BMI ≥40, obesity class III

Usual body weight (UBW)
% UBW = current weight/UBW x 100
Weight loss in context of time
If available and practical: body composition or percentage of body fat as measured by skinfold thickness, bioimpedance analysis, air displacement plethysmography, ultrasound, magnetic resonance imaging, computed tomography, and/or dual-energy x-ray absorptiometry[22]
Nutrition-focused physical examination: possible indications of malnutrition
- Hair loss; dull, dry, brittle hair; loss of hair pigment
- Loss of subcutaneous tissue; muscle wasting
- Poor wound healing: pressure ulcer
- Region surrounding the eye: dark circles, hollow look, depressions, loose skin
- Upper part of arm: minimal space between skinfolds
- Thoracic and lumbar regions: depressions between ribs apparent, iliac crest prominent
- Assessment of edema (localized or generalized)

Data to be collected for documenting diminished functional status

Hand grip strength (not always practical in intensive care setting)
Ability to be weaned from mechanical ventilation
Ability to tolerate physical therapy
Ability to perform activities of daily living
General performance status

[a] Based on information from White et al[15] and Malone and Hamilton.[23]

The first step in nutritional assessment is detecting patients who have compromised intake, loss of body mass, or both.[20] A total of 2 or more of the following 6 characteristics are currently recommended for the diagnosis of malnutrition in adults[14,15]: insufficient energy intake, weight loss, loss of muscle mass, loss of subcutaneous fat, localized or generalized fluid accumulation that may sometimes mask weight loss, and diminished functional status (eg, as indicated by hand grip strength).

Critical care nurses are in a key position to document these characteristics in screening and assessment of patients for malnutrition. Whenever possible, assessment data should be collected by using measurements rather than be obtained from patients' self-reports or collected from patients' family members. Table 1 outlines the specific information and data to be collected and used for the detection and documentation of malnutrition. After patients with nutritional risk have been identified, the presence or absence and degree of inflammation should be assessed to determine the type of malnutrition. Table 2 gives parameters that may be useful in assessing inflammation status. Severe inflammation is easier to identify than are other types because clinical signs and symptoms of severe inflammation tend

A 75-year-old man was transported by ambulance to the emergency department after his wife noticed that his left leg and arm were weak and his speech was slurred. She also noticed that he had a left-sided facial droop. Per family report, approximately 1 hour elapsed between the start of his signs and symptoms and his arrival in the emergency department. His initial vital signs were blood pressure 180/100 mm Hg, heart rate 60/min, and respirations 16/min. On admission, his core temperature was 100°F (37.8°C), and his score on the Glasgow Coma Scale was 9. He was able to speak and said that he had no headache, chest pain, or shortness of breath. Assessment revealed a history of hypertension and transient ischemic attacks. Medical work-up confirmed an ischemic stroke of the right middle cerebral artery.

His family reported that he had been steadily losing weight during the preceding 4 months—his usual body weight was about 275 lb (123.8 kg)—and his appetite was poor. During the preceding year, he had become less active and more easily fatigued. Currently his height was 5 ft 10 in (177.8 cm) and his weight was 258 lb (116.1 kg). He had bowel sounds and no history of gastrointestinal problems other than decreased appetite. Laboratory results included fasting levels of blood glucose 132 mg/dL (to convert to millimoles per liter, multiply by 0.0555) hemoglobin A_{1c} 6.8%, triglycerides 159 mg/dL (to convert to millimoles per liter, multiply by 0.0113), and C-reactive protein 49 mg/L (to convert to nanomoles per liter, multiply by 9.524). Physical examination revealed waist circumference greater than 40 in (>102 cm), and possible loss of muscle mass in the upper and lower extremities.

Thrombolytic therapy was initiated within 25 minutes of the patient's arrival at the ED. He was admitted to the ICU for monitoring and frequent neurological checks and blood pressure management during and after thrombolytic therapy. During the thrombolytic therapy, the patient's strength improved and his speech was beginning to improve. He was given nothing by mouth overnight. On hospital day 2, the patient's neurological status was normal except for a mild left-sided facial droop and mild dysarthria. He passed a formal swallow evaluation performed by the ICU's speech language pathologist and was cleared to eat a mechanical soft diet (one with ground or pureed foods that are easy to chew and swallow) and thin liquids. Blood pressure was maintained at less than 160/90 mm Hg, and no infusions were needed once the patient was started on his home blood pressure medications. No further complications developed, and the patient was later transferred out of the ICU to the neurology unit.

Table 2 Clinical and laboratory information useful in assessing inflammation[a]

Clinical	Laboratory
Presence of acute or chronic clinical condition(s) associated with inflammatory response	Decreased serum level of albumin, transferrin, or prealbumin
Fever	Elevated serum level of C-reactive protein
Hypothermia	Elevated level of blood glucose
Presence of infection	Elevated percentage of neutrophils in the cell differential
Urinary tract infection	Decreased platelet count
Pneumonia	Decreased or increased white blood cell count
Sepsis	Marked negative nitrogen balance
Wound or incisional infection	
Abscess	

[a] Based on information from White et al[15] and Malone and Hamilton.[23]

to be overt and laboratory values tend to be markedly abnormal. Mild to moderate inflammation is associated with chronic conditions and so can be more difficult to discern. Thus, a patient's nutritional status and characteristics should be assessed in the context of the patient's overall clinical situation. Any characteristics of malnutrition identified should be documented at baseline and at frequent intervals throughout the patient's hospital stay.[14,15] Tracking information collected at multiple times and trends in assessment data are more useful in determining nutritional status and the efficacy of intervention than are data from a single time.[24] The

information gathered during the nutritional assessment is the foundation for the nutritional intervention. Every member of the health care team should document pertinent information in the member's chart notes. Effective recognition and management of malnutrition in the ICU requires education of nurses and physicians and reliable communication among members of the critical care team, including nursing, pharmacy, medical, and nutrition disciplines. The team approach ensures prompt recognition of malnutrition when a patient is admitted and swift collection of assessment data for early intervention and better patient outcomes.

Risk for Malnutrition in Obese Critically Ill Patients

An estimated 25% to 30% of patients admitted to an ICU have a body mass index (calculated as weight in kilograms divided by height in meters squared) greater than 30.[25] Chronic obesity results in pathophysiological alterations in all major organ systems; the main derangements are in cardiovascular, respiratory, and metabolic functions.[26]

Nutritional assessment based on body composition or percentage of body fat in obese intensive care unit patients can help identify at-risk patients and guide optimal nutritional care.

Many recent studies[27-36] on morbidity and mortality rates of obese critically ill patients have indicated that although obesity may not have an effect on hospital mortality rates (and may even have a protective effect), obese patients tend to have increased hospital morbidity as evidenced by longer duration of mechanical ventilation, longer ICU length of stay, longer hospital length of stay, and increased rate of infection. Missed or delayed detection of malnutrition in these patients may contribute to these adverse outcomes.

Obesity is defined as having excess adipose tissue mass or fat mass for a given body weight. Compared with lean individuals, patients with extreme obesity have greater amounts of adipose tissues in all depots. When the adiposity is greater in the abdominal region, the risks for insulin resistance, hyperglycemia, metabolic syndrome, and associated complications in the ICU are increased. In addition, obese persons have increased levels of proinflammatory cytokines that cause chronic, mild to moderate inflammation and contribute to the signs and symptoms of metabolic syndrome, such as hyperglycemia.[37]

Compared with lean persons, severely obese persons tend to have a relatively lower percentage of lean body mass.[38] Because weight loss involves a loss of both fat mass and lean mass, unintended weight loss in obese persons results in a body composition that continues to have a lower percentage of lean mass, and this lower percentage contributes to reduced strength.[38] Critically ill obese patients are at high risk for sarcopenic obesity, the type of malnutrition with chronic mild to moderate inflammation. Sarcopenic obesity is characterized by loss of muscle mass, with reduced physical function.[22,38] Nutritional assessment based on body composition or percentage of body fat in obese ICU patients can help identify at-risk patients and guide optimal nutritional care. Current nutritional support guidelines for adult patients with obesity emphasize high-protein, hypocaloric feedings (assuming no renal or hepatic dysfunction), and provision of adequate nutrients for recovery and promotion of strength rather than weight loss.[39,40] Better understanding of this type of chronic malnutrition will ensure timely identification and early nutritional intervention.

Comment

Regarding the case study, nursing care of patients who have had a stroke has many aspects, including ongoing neurological assessments and seizure precautions, blood pressure and neurological monitoring, screening for indications of dysphagia, promoting comfort and providing support to the patients and their family members, and providing adequate nutrition. Standardized order sets and critical paths are often used to guide the critical care team in determining the appropriate treatment plan. According to the information just presented and the data in Table 3, the patient had underlying chronic disease- related malnutrition, most likely characterized by sarcopenic obesity. Nutrition along with medical treatments such as thrombolytic therapy were critical for his recovery. Detection of malnutrition in this case was based on a clinical history of insufficient energy intake, unintended weight loss, compromised strength and functional status, and chronic inflammation. In documenting the patient's malnutrition during nutrition assessment, the following diagnostic criteria with supporting evidence should have been included in his medical chart (specific data outlined in Table 3): insufficient energy intake, weight loss, loss of muscle mass, diminished functional status, and chronic inflammation.

Table 3 Case study data used in nutritional assessment to identify and document malnutrition related to chronic disease

Category	Data
Clinical state	Bowel sounds evidence of working gut with no gastrointestinal issues Longstanding obesity and metabolic syndrome as evidenced by Clinical history BMI[a] = 37.0, obesity class II Abdominal adiposity as evidenced by waist circumference Laboratory values indicative of metabolic syndrome Elevated levels of blood glucose and hemoglobin A_{1c} indicative of impaired glucose metabolism/insulin resistance Elevated blood pressure Elevated fasting level of triglycerides
Data indicating inadequate energy intake	Poor appetite before admission Typical 24-hour diet recall with patient and his wife revealed insufficient energy intake
Data indicating weight loss, loss of muscle mass, and/or loss of subcutaneous fat	% UBW = 94% UBW Unintentional weight loss; % weight change = 6% weight loss Body composition measurements could be used to confirm suspected loss of muscle mass
Data indicating diminished functional status	Functional impairment as evidenced by difficulty ambulating and loss of strength in preceding year per family report
Data indicating mild to moderate inflammation	Elevated serum level of C-reactive protein typical of inflammation associated with obesity Elevated blood glucose level

Abbreviations: BMI, body mass index; UBW, usual body weight.
[a] Calculated as weight in kilograms divided by height in meters squared.

The emphasis of nutritional intervention should be provision of adequate nutrients for helping recovery and promoting strength rather than weight loss. Recognizing the signs and symptoms of chronic disease-related malnutrition ensures early nutritional assessment and timely intervention.

Discussion and Nursing Implications

The new Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition guidelines for assessment of malnutrition in adults highlight the importance of inflammation in distinguishing the different types of malnutrition syndromes.[15] The new guidelines and the information on the less readily recognized chronic disease-related malnutrition that could be manifested by obese critically ill patients are relevant to critical care nurses because the materials emphasize the key role of nurses in collecting information that will be used in nutritional assessment and in documentation of the rationale for the nutritional intervention plan. The frequency and intensity of contact of critical care nurses with critically ill patients place the nurses in a prime position to detect malnutrition. Keeping up with current guidelines promotes effective team communication, ensuring that at-risk patients receive timely nutritional support that will improve clinical outcomes. A team approach to nutritional assessment is advocated to ensure the best quality of patient care.[38] CCN

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To learn more about malnutrition in critically ill patients, read "Optimizing Nutrition in Intensive Care Units: Empowering Critical Care Nurses to Be Effective Agents of Change" by Marshall et al in the *American Journal of Critical Care*, May 2012;21:186-194. Available at **www.ajcconline.org**.

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New Guidelines for Assessment of Malnutrition in Adults: Obese Critically Ill Patients

Facts

Critical care patients tend to be at high risk for malnutrition and thus require a thorough nutritional assessment. Critical care nurses are in a prime position to screen patients at risk for malnutrition and to work with members of the interprofessional team in implementing nutritional intervention plans.

- Malnutrition in critically ill patients is associated with increased hospital morbidity and mortality, increased risk for infections, compromised immune status, poor wound healing, and extended hospital lengths of stay.
- The 3 etiology-based definitions of malnutrition in the new guidelines are starvation-related malnutrition without inflammation, chronic disease-related malnutrition with mild to moderate inflammation, and acute disease- or injury-related malnutrition with marked inflammation.
- A total of 2 or more of the following 6 characteristics are currently recommended for the diagnosis of malnutrition in adults: insufficient energy intake, weight loss, loss of muscle mass, loss of subcutaneous fat, localized or generalized fluid accumulation that may sometimes mask weight loss, and diminished functional status (eg, as indicated by hand grip strength).
- After patients with nutritional risk have been identified, the presence or absence and degree of inflammation should be assessed to determine the type of malnutrition. The Table gives parameters that may be useful in assessing inflammation status.
- Compared with lean individuals, patients with extreme obesity have greater amounts of adipose tissues in all depots. When the adiposity is greater in the abdominal region, the risks for insulin resistance, hyperglycemia, metabolic syndrome, and associated complications in the intensive care unit are increased.
- Keeping up with current guidelines promotes effective team communication, ensuring that at-risk patients receive timely nutritional support that will improve clinical outcomes. A team approach to nutritional assessment ensures the best quality of patient care. CCN

Table Clinical and laboratory information useful in assessing inflammation[a]

Clinical	Laboratory
Presence of acute or chronic clinical condition(s) associated with inflammatory response	Decreased serum level of albumin, transferrin, or prealbumin
Fever	Elevated serum level of C-reactive protein
Hypothermia	Elevated level of blood glucose
Presence of infection	Elevated percentage of neutrophils in the cell differential
Urinary tract infection	Decreased platelet count
Pneumonia	Decreased or increased white blood cell count
Sepsis	Marked negative nitrogen balance
Wound or incisional infection	
Abscess	

[a] Based on information from White et al[15] and Malone and Hamilton[23] [see article for citation information].

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