Should we be using albumin to assess nutritional status?

Why do some dieticians and facility staff believe that everyone needs an albumin level?

Has an albumin level ever changed nutritional management?

Does albumin/prealbumin really give information about nutritional status?

The Problems

1. The myth that albumin and prealbumin correlate with malnutrition

1. CMS Memorandum from June 20, 2008

CMS Guidance to Surveyors Regarding Nutrition 2008

- **§483.25(i)(1) Maintains acceptable parameters of nutritional status, such as body weight and protein levels, unless the resident's clinical condition demonstrates that this is not possible;**

  However….

- *"The decision to order laboratory tests, and the interpretation of subsequent results, is best done in light of a resident's overall condition and prognosis. Before ordering laboratory tests it is appropriate for the health care practitioner to determine and indicate whether the tests would potentially change the resident's diagnosis, management, outcome or quality of life or otherwise add to what is already known.* ***Although laboratory tests such as albumin and pre-albumin may help in some cases in deciding to initiate nutritional interventions, there is no evidence that they are useful for the serial follow-up of undernourished individuals.****"*

- **Some facilities and dietitians interpreted this to mean that everyone needs an albumin level checked**

§483.25 Quality of care 2024

- "Maintains acceptable parameters of nutritional status, such as usual body weight or desirable body weight range and electrolyte balance, unless the resident's clinical condition demonstrates that this is not possible or resident preferences indicate otherwise;"
- **Protein levels no longer mentioned in CMS guidelines for nutrition**
- **Clinical evidence does not support the use of these markers to define malnutrition.**

Albumin and Prealbumin Facts

- Albumin and prealbumin are:
  - Reduced in many chronic diseases and inflammatory states
  - **A proxy for INFLAMMATION**
  - NEGATIVE acute phase reactants (inflamation up, albumin/prealbumin down)
  - Lower when inflammation is present (regardless of nutritional status)
  - NOT a good proxy for malnutrition
  - Not sensitive or specific indicators of malnutrition
    - Many factors and disease processes can affect the levels
    - Normal albumin (prealbumin) levels have been seen in studies of patients with very low BMIs
    - But…MIGHT indicate risk for developing malnutrition
  - Not part of the currently accepted definition of malnutrition
  - Not valid measures of total body protein or muscle mass
- Role in evaluation of nutritional status is undefined and complicated

“Changes in nutritional markers do not predict clinical outcomes (6).”

Definitions of Malnourished

1. The patient has abnormal markers of nutritional status (11)
    a. But…Abnormal markers can be caused by many things and may not respond to nutritional support
    b. Many cancer patients do not respond to nutritional support

1. There is evidence to suggest the patient will benefit from nutrition support (11)
    b. This definition is more clinically useful

The Use of Visceral Proteins as Nutrition Markers: An ASPEN Position Paper - PubMed (nih.gov)

- ASPEN = American Society for Parenteral and Enteral Nutrition
- Albumin and prealbumin characterize inflammation.
  - There is a strong association between albumin/prealbumin and the Acute/Chronic inflammatory state
- Albumin and prealbumin do not describe nutritional status or protein-energy malnutrition.
- Can be low in hypermetabolic and hypercatabolic states
- Can be low in inflammatory states regardless of nutritional status
- Low albumin and prealbumin are inflammatory markers that MAY be indicators of risk for developing malnutrition
- Low albumin and prealbumin do NOT define malnutrition

“These proteins correlate well with patients’ risk for adverse outcomes rather than with protein-energy malnutrition. Therefore, serum albumin and prealbumin should not serve as proxy measures of total body protein or total muscle mass and should not be used as nutrition markers.”

Strong association between inflammation and malnutrition

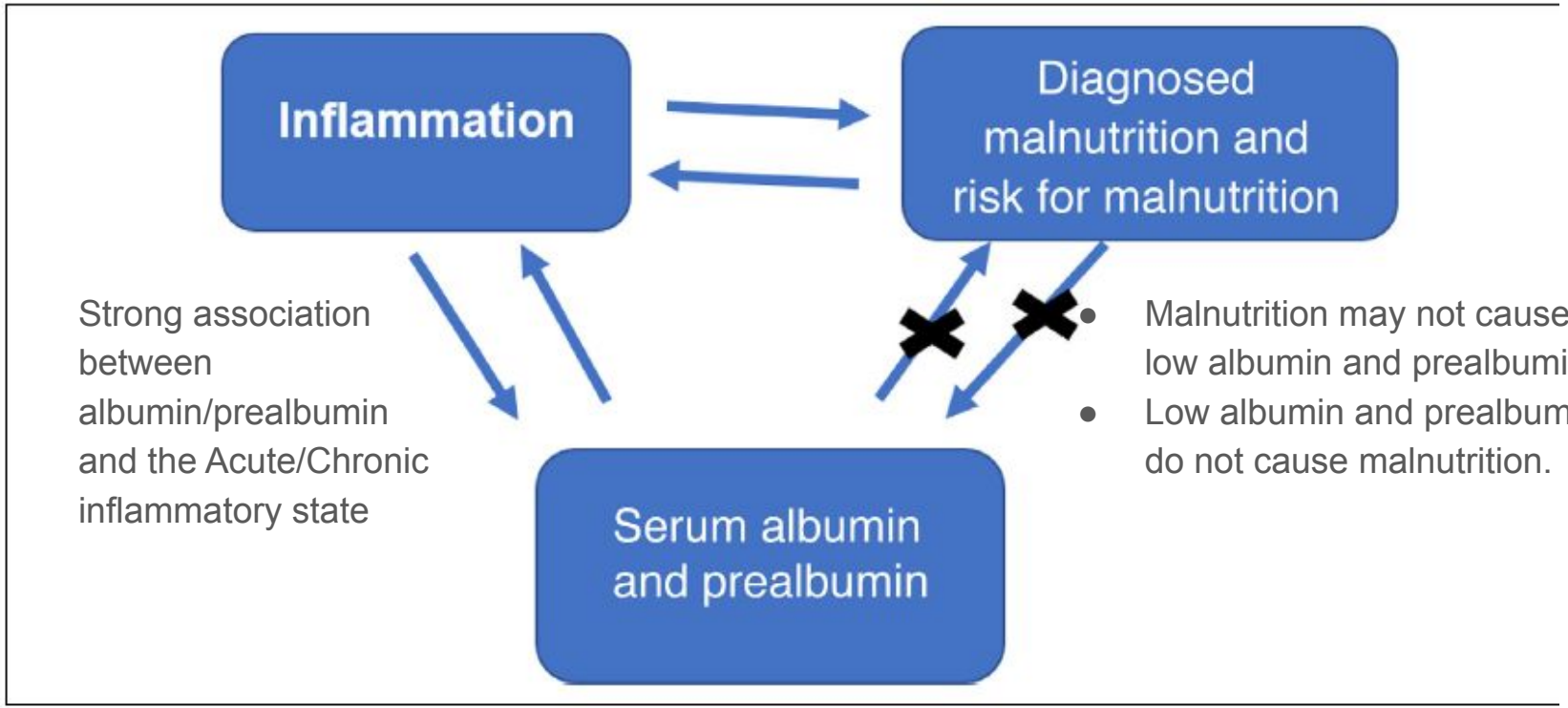

Figure 1. Relationship between malnutrition, inflammation, and visceral proteins.

Role of Albumin and Prealbumin in Monitoring Nutritional Interventions

- Albumin and prealbumin levels in healthy patients do not decline until BMI < 12 or more than 6 weeks of starvation (11).
- Albumin and prealbumin levels correlate poorly with nutritional intake
- Normalization of albumin and prealbumin levels likely indicates a reduction in the inflammatory process and a transition to an anabolic state leading to improved nutrition (2).
- Improvement in inflammation, rather than nutrient intake, may be responsible for increases in albumin and prealbumin levels (7).

Characteristics Recommended for the Identification of Adult Malnutrition (AND and ASPEN)

- “There are no consistent reliable biochemical indicators of protein status (4).”
- Recommended that Identification and Documentation of Adult Malnutrition (Undernutrition)” **no longer include these measures or any other biomarkers, focusing instead on “insufficient energy intake,” and anthropometric and functional measures.**

Characteristics Recommended to Evaluate Adult Malnutrition

- Loss of muscle
- Loss of subcutaneous fat
- Fluid accumulation (masking weight loss)
- Loss of functional status
    - Reduced hand grip strength

Consensus Statement: Academy of Nutrition and Dietetics and American Society for Parenteral and Enteral Nutrition - White - 2012 - Journal of Parenteral and Enteral Nutrition - Wiley Online Library

Nutritional Assessments

- SGA - Subjective Global Assessment
- MUST - Malnutrition Universal Screening Tool
- NRS - 2002 - Nutrition Risk Screening 2002
- MNA - Mini Nutritional Assessment
- MST - Malnutrition Screening Tool

- PON - Perioperative Nutritional Screening Tool.
  - The only one that uses albumin/prealbumin
  - Low albumin/prealbumin is associated with post op complications
  - Maybe low albumin is a proxy for higher inflammation which leads post op complications ??

References

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10. Serum Levels of Albumin and Prealbumin Do Not Correlate With Nutrient Delivery in Surgical Intensive Care Unit Patients - PubMed (nih.gov)
11. Serum Albumin and Prealbumin in Calorically Restricted, Nondiseased Individuals: A Systematic Review (amjmed.com)
12. Issuance of Revised Nutrition and Sanitary Conditions. CMS
13. eCFR :: 42 CFR 483.25 -- Quality of care.

History of Markers for Nutrition Assessment

- 1977 – Nutritional and Metabolic Assessment of the Hospitalized Patient, Blackburn et al
  - Serum albumin and transferrin/TIBC could be used to identify malnutrition
- 1979 - Serum Albumin and transferrin standard components of nutritional assessment.
  - “Instant nutritional assessment”
  - “In 1979, Seltzer et al76 declared that 2 readily available “parameters, albumin (a measure of visceral protein) and total lymphocyte count (a poor man’s assessment of immunocompetency) will form the basis of instant nutritional assessment.” Low values were strongly associated with mortality among hospitalized patients, and the authors recommended that their assessment “be performed on all hospitalized patients with appropriate alterations and therapy being made to allow for nutritional repletion.” This has been cited as the first description of nutritional assessment,77 and some clinicians and researchers continue to use serum albumin (and prealbumin) in this way. “(11)
- 1995 - prealbumin emerged as a more sensitive marker for dx of malnutrition and monitor response to nutritional therapy.

Why This Is Unnecessary and Potentially Harmful

- **Prealbumin is not specific – many factors can affect the prealbumin level that are unrelated to nutritional status.[5]**

TABLE 1. Factors Affecting Prealbumin

Increased by:	Decreased by:
Exogenous corticosteroids	Acute phase response
NSAIDs	Malnutrition
Renal failure	Liver disease
Dehydration	Thyroid disease
	Hemodilution
	Nephrotic syndrome
	Protein-losing enteropathy
	Acute blood loss

Abbreviations: NSAIDs, nonsteroidal anti-inflammatory drugs

- **Prealbumin is not sensitive – normal prealbumin levels have been seen in studies of patients with mean BMIs as low as 12.9 kg/m2.6**

Serum Albumin and Prealbumin in Calorically Restricted, Nondiseased Individuals: Systematic Review (amjmed.com)

- Systematic review
- Undernourished people without inflammatory disease

- RESULTS: **In otherwise healthy subjects, serum albumin and prealbumin levels remained normal despite marked nutrient deprivation until the extremes of starvation, that is, body mass index <12 or more than 6 weeks of starvation.**

- CONCLUSIONS: In these otherwise healthy subjects, serum albumin and prealbumin levels are not "markers of nutritional status." **The "markers" failed to identify subjects with severe protein-calorie malnutrition until extreme starvation.** That is, they failed to identify healthy individuals who would benefit from nutrition support, becoming abnormal only when starvation was already obvious. In contrast, serum albumin and prealbumin levels are known to fall promptly with injury or illness regardless of nutrient intake. They are negative acute-phase reactants. When these measures are low in sick patients, this cannot be assumed to reflect nutritional deprivation. Decisions about nutrition support should be based on evidence of meaningful benefit from this treatment rather than on assessment of "nutritional markers."

The Use of Visceral Proteins as Nutrition Markers: An ASPEN Position Paper - Evans - 2021 - Nutrition in Clinical Practice - Wiley Online Library

Executive Summary

- Serum albumin and prealbumin are not components of currently accepted definitions of malnutrition.
- Serum albumin and prealbumin do not serve as valid proxy measures of total body protein or total muscle mass and should not be used as nutrition markers.
- The serum concentrations of albumin and prealbumin decline in the presence of inflammation, regardless of underlying nutrition status.
- Serum albumin and prealbumin declines must be recognized as inflammatory markers associated with “nutrition risk” in the context of nutrition assessment rather than with malnutrition per se. Nutrition risk is broadly defined as the risk of developing malnutrition and/or poor clinical outcomes if nutrition support is not provided.
- The role of serum albumin and prealbumin in monitoring delivery and efficacy of nutrition support remains undefined. Their normalization may indicate the resolution of inflammation, the reduction of nutrition risk, a transition to anabolism, or potentially lower calorie and protein requirements.