

Review Article

High-protein albumin-based nutritional support in severe hypoalbuminemia: a narrative review of ALBUCURE efficacy, tolerability and clinical outcomes

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ABSTRACT

Hypoalbuminemia is a common clinical condition among hospitalized patients and is linked with increased morbidity, prolonged hospitalization, impaired wound healing, infections, and mortality. Nutritional interventions aimed at improving protein intake may enhance endogenous albumin synthesis and improve clinical outcomes. A narrative review of published literature was conducted using studies evaluating high protein nutritional supplement, particularly egg white derived albumin formulations, in patients with hypoalbuminemia. Relevant clinical studies, reviews, and nutritional guidelines published in peer-reviewed journals were examined. Available evidence suggests that high-protein albumin formulations significantly improve dietary protein intake, nutritional status, and serum albumin concentrations in hospitalized patients. Egg-white-derived proteins possess high biological value, complete essential amino acid composition, and excellent digestibility. Clinical studies evaluating formulations such as Albuwise showed improvements in serum albumin levels, and gastrointestinal tolerance. Oral nutritional supplementation appears to offer advantages over intravenous albumin administration by addressing underlying nutritional deficits while remaining cost-effective and sustainable. High protein albumin formulations such as ALBUCURE may represent a promising nutritional strategy for managing severe hypoalbuminemia in hospitalized patients. Current evidence supports their efficacy and tolerability; however, large randomized controlled trials are needed to establish definitive clinical recommendations.

Keywords: Clinical nutrition, Egg white protein, Hypo-albuminemia, Hospitalized patient, Nutritional supplementation, Oncotic, Serum albumin

INTRODUCTION

Hypoalbuminemia, generally defined as serum albumin concentrations below 3.5 g/dl, is a common finding among hospitalized patients and is associated with increased morbidity, prolonged hospital stay, delayed wound healing, prone to infections, and increased mortality.^{1,2} Severe hypoalbuminemia when serum

albumin is <2.5 g/dl reflects substantial nutritional and metabolic compromise and is frequently observed in critically ill patients, elderly individuals, and those with chronic inflammatory conditions.³

Albumin, the most abundant plasma protein synthesized by the liver and helps in essential physiological functions including maintenance of colloid oncotic pressure, transport of endogenous and exogenous substances,

antioxidant activity, and modification of inflammatory responses.⁴ Accordingly, reduced serum albumin concentrations may adversely affect multiple physiological systems. Traditional management of hypoalbuminemia has included intravenous albumin administration; however, studies suggest that nutritional correction and adequate protein intake remain fundamental for restoring endogenous albumin synthesis and improving overall nutritional status.⁵ High-protein nutritional formulations derived from egg-white proteins have emerged as promising therapeutic options because of their superior biological value and favorable amino acid composition.⁶

This review summarizes current evidence regarding the efficacy, tolerability, and potential clinical benefits of high-protein albumin formulations, particularly protein supplement (ALBUCURE), in hospitalized patients with severe hypoalbuminemia.

LITERATURE REVIEW

A narrative review of published literature was conducted using web search engine including PubMed, Google Scholar, Scopus, and ScienceDirect. Relevant studies published in English up to 2025 were identified using some combinations of the keywords related with this article. Original research articles, clinical trials, retrospective studies, case reports, systematic reviews, and clinical practice guidelines evaluating nutritional interventions for hypoalbuminemia were included. Studies focusing solely on intravenous albumin therapy without nutritional interventions were excluded.

PATHOPHYSIOLOGY OF HYPOALBUMINEMIA

Hypoalbuminemia develops through multiple mechanisms including reduced hepatic synthesis, high catabolism rate, capillary leakage, renal protein loss, gastrointestinal protein loss, and chronic inflammation.²

Inflammatory cytokines such as interleukin-6 and tumor necrosis factor- α suppress albumin synthesis and increase vascular permeability, leading to redistribution of albumin from the intravascular to the extra vascular compartment. Consequently, serum albumin concentration often reflects both nutritional status and inflammatory burden.⁷

CLINICAL CONSEQUENCES OF SEVERE HYPOALBUMINEMIA

Numerous studies have demonstrated that severe hypoalbuminemia is associated with adverse clinical outcomes. Patients frequently experience peripheral edema, muscle wasting, impaired immune function, delayed wound healing, prolonged hospitalization, increased intensive care unit admission, and higher mortality risk.⁸

A meta-analysis by Vincent et al identified hypoalbuminemia as an independent predictor of mortality across diverse patient populations.⁹ Similarly, epidemiological studies have reported a strong association between low serum albumin concentrations and poor clinical outcomes among hospitalized adults.¹⁰

NUTRITIONAL MANAGEMENT OF HYPOALBUMINEMIA

Current clinical nutrition guidelines emphasize early nutritional intervention and adequate protein intake for hospitalized patients. Recommended protein intake generally ranges from 1.2-2.0 g/kg/day depending on disease severity and metabolic stress.^{11,12}

Adequate dietary protein supports hepatic protein synthesis, preserves lean body mass, improves immune competence, and promotes tissue repair. Nutritional supplementation is increasingly favored because it addresses the underlying causes of protein deficiency rather than providing temporary correction of serum albumin levels.¹³

ROLE OF EGG-WHITE-DERIVED HIGH-PROTEIN FORMULATIONS

Egg-white protein (ovalbumin) is considered a high-quality protein source because it contains all essential amino acids in optimal proportions and possesses a biological value approaching 100.¹⁴ Several characteristics make egg-white protein particularly suitable for clinical nutrition that is complete amino acid profile, high digestibility, low fat content, minimal phosphorus burden and last but not the least good gastrointestinal tolerance. Research has demonstrated that egg-derived proteins support protein synthesis, immune function, and nutritional rehabilitation in patients with increased metabolic demands.¹⁵

EVIDENCE SUPPORTING HIGH-PROTEIN ALBUMIN FORMULATIONS

Recent studies have measured specialized high protein albumin formulations in patients with hypoalbuminemia. In the INDI ALB-PHASE 2 multicentric retrospective study, Singh et al. assessed the efficacy and tolerability of a supplementary product (Albuwise) among hospitalized patients with hypoalbuminemia. Following 45 days of supplementation, participants demonstrated improvements in serum albumin concentration, caloric intake, protein intake, nutritional status, and gastrointestinal tolerance.¹⁶ Similarly, Singh and Golandaz reported successful nutritional rehabilitation using a semi-elemental egg-white-derived nutritional formulation in hospitalized patients. Improvements in serum albumin levels and overall nutritional recovery were observed without significant adverse events.¹⁷ A systematic review and meta-analysis by Bagheri et al further demonstrated that targeted nutritional

supplementation can significantly improve serum albumin concentrations in hospitalized patients.¹⁸

POTENTIAL CLINICAL APPLICATIONS OF ALBUCARE

Based on available evidence from similar formulations, a particular protein supplement (ALBUCURE) may provide several clinically relevant benefits like.¹⁷

Improvement in serum albumin concentration

Provision of high-quality dietary protein supports endogenous hepatic albumin synthesis.

Enhancement of nutritional status

Adequate protein intake promotes preservation of lean body mass and improves nitrogen balance.

Reduction in hospital stay

Correction of nutritional deficiencies may accelerate recovery and reduce complications.

Improvement in quality of life

Enhanced nutritional status contributes to improved physical functioning and reduced fatigue.¹⁷

TOLERABILITY AND SAFETY

Published studies have consistently reported favorable tolerability profiles for egg-white-derived protein supplements.^{16,17} Common findings includes like minimal gastrointestinal discomfort, good taste, improved stool consistency and transit time, reduced nausea and vomiting, absence of serious allergic reactions compared with intravenous albumin administration, oral nutritional formulations are associated with lower costs and reduced treatment-related complications.¹⁷

Table 1: Comparison with intravenous albumin therapy.

Parameters	High-protein albumin formula	Intravenous albumin
Route	Oral	Intravenous
Cost	Lower	Higher
Corrects nutritional deficiency	Yes	No
Supports endogenous albumin synthesis	Yes	Limited
Long-term sustainability	High	Low
Risk of adverse reactions	Low	Moderate

Although intravenous albumin may provide short-term correction of oncotic pressure, it does not adequately address underlying nutritional deficiencies.¹⁹

PUBLIC HEALTH IMPLICATIONS

Hypoalbuminemia contributes substantially to healthcare burden through increased morbidity, prolonged hospitalization, and higher treatment costs. Affordable nutritional interventions capable of improving protein status may reduce healthcare expenditure and improve patient outcomes, particularly in resource-limited settings. High protein nutritional formulations (Albucure, Albuwise) may therefore have significant public health relevance.²⁰

CONCLUSION

Severe hypoalbuminemia remains an important clinical and public health challenge among hospitalized patients. Current evidence suggests that high-protein albumin formulations derived from egg-white proteins are effective and well tolerated. Improvements in serum albumin concentrations, nutritional status, protein intake, and gastrointestinal tolerance have been reported in several clinical studies. Protein supplementations (ALBUCURE) may represent a promising adjunctive nutritional strategy for hospitalized patients with severe hypoalbuminemia. However, adequately powered randomized controlled trials are required to establish definitive efficacy, optimal dosing strategies, and long-term clinical outcomes.

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