

## Effect of Synbiotic Supplementation on Serum Systemic Inflammatory Marker and Serum Albumin in Patients Admitted to ICU

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**Introduction:** The role of inflammation and malnutrition in critically ill patients has been shown in some studies. The aim of the study is to determine the effect of symbiotic on serum systemic inflammatory marker (hs-CRP) and albumin in critically ill patients.

**Methods:** Sixty patients admitted to the intensive care unit of Sabzevar Vasei hospital were randomized two groups that received symbiotic or placebo for 2 weeks. Levels of serum hs-CRP and albumin were measured before and after the study.

**Results:** There was a significant differences between two groups the Levels of serum hs-CRP ( $P=0.0001$ ) and albumin ( $P=0.0001$ ).

**Conclusion:** Results of study were showed that administration of symbiotic in critically ill patients reduced the levels of serum hs-CRP and increased the levels of serum albumin.

**Keywords:** Synbiotic; hs-CRP; Albumin; Critically ill

**Introduction:** A hyper-catabolic state and systemic inflammation and sepsis common seen in critically ill patients. Serum Albumin is one among the simplest indicators of nutrition status and hypo-albuminemia has been considered as protein malnutrition. In some studies, serum albumin has been more significantly influenced by factors other than nutritional intake. Inflammation may reduce albumin level and severe hypo-albuminemia are common in critically ill patients. Recently, it is suggested that consumption of probiotics would be a novel approach to decrease inflammation in humans. Probiotics are kinds of living microorganisms which have beneficial health effects on humans. Two main groups of probiotic bacteria which are most used involving Lactobacillus and bi-

fidobacteria. Prebiotics are carbohydrate that transit undigested through the tiny intestine and reach the colon where stimulate the expansion and /or activity of probiotics. However, available evidence about the effects of probiotic on inflammation is controversial. Therefore, the purpose of this study is to evaluate the effects of symbiotic (pre and probiotic) on serum C-reactive protein (CRP) as a marker of inflammation and albumin as a nutritional status marker.

### Methods

**Protocol design:** Sixty patients were participated in the study of Vaseei hospital in sabzevar. In this Study, inclusion criteria were critically ill patients who were 18-40 years, expected to stay in ICU at least 2 weeks, and received enteral nutrition and require mechanical ventilation. Exclusion criteria were patients who could not tolerate enteral nutrition, unstable hemodynamics, cancer, diabetes mellitus, immune disorders, intestinal obstruction or ischemia and they who expected to expire in less than 2 weeks. After approval of ethics committee of Sabzevar university of Medical Sciences and written informed consent was obtained from all guardian participants, patients were randomized to two groups, the first group received standard treatment plus placebo and therefore the second group received standard treatment plus symbiotic (Bioplus Life Sciences Pvt. Ltd. Bangalore, India) 2 tablets daily for 2 Weeks. Each tablet of symbiotic contained of  $150 \times 10^6$  spores of Lactobacillus Coagulant and 100 mg Fructo-Oligosaccharides.

**Data collection:** Energy requirement were calculated as 25-30 kcal /kg bw. Fasting blood sample were obtained from each patient to guage serum hs- CRP and albumin on day 1 and 14. Serum hs-CRP was

measured by using Enzyme Linked Immuno Sorbent Assay (ELISA) kits (Monobind, Inc., Lake Forest, Calif., USA) and albumin decided using Bromcresol Green method by auto-analyzer selectra 2, kits (Pars Azmoon., Tehran., Iran).

**Data analysis:** Data were analysed by SPSS Version 16 and by independent t-test and paired t-test. P-Value 0.05

BMI (kg/m<sup>2</sup>) 22.10 ± 2.00 22.09 ± 2.00 P>0.05.

**Results:** In this study, there were 20 female and 40 males. Demographic data of patients was shown in Table 1. No significant differences were observed patients' demographic data between two groups. Levels of serum hs-CRP and albumin at the first and the end of study were shown in Table 2. There was a significant difference between two groups in levels of serum hs-CRP and albumin (P=0.0001, P=0.0001 respectively).

	Placebo group	Symbiotic group	P value
Age (year)	32.77 ± 2.26	32.70 ± 1.70	P>0.05
Sex (Male/female)	(21/9)	(19/11)	P>0.05
BMI (kg/m <sup>2</sup> )	22.10 ± 2.00	22.09 ± 2.00	P>0.05

Table 1: Demographic data of patients in the study.

	CRP (mg/L)		Albumin (g/dl)	
	Symbiotic	Placebo	Symbiotic	Placebo
Day 1	2.76 ± 1.07	2.46 ± 1.00	3.64 ± 0.09	3.52 ± 0.09
Day 14	2.06 ± 1.01	3.40 ± 1.50	3.90 ± 0.10	3.41 ± 0.09
P-value	0.0001		0.0001	

Table 2: Levels of serum hs-CRP and Albumin at baseline and the end of the study in two groups.

**Discussion:** The present study was showed that critically ill patients who received symbiotic supplementation, had reduction in inflammation than did the patients received placebo. C-reactive protein or CRP is commonly used as a marker of systemic inflammation and its serum level is a useful indicator of the extent of an inflammatory process. Kotzampassi et al. was reported a similar finding. In their study, consumption of synbiotic 2000 forte, caused a big reduction in serum CRP compared to placebo group. Also, the Study was done by Alberda et al., probiotics VSL # 3 treatment was decreased serum CRP levels quite placebo or bacterial sonicates. A dissimilar results

was reported by Mc Naught et al. enteral feeding of Provia, an oatmeal-based drink containing lactobacillus plantarum 299 V to critically ill patients had no significant effect on serum CRP Levels. Similarly, a study on 6 Volunteers for a period of 6 weeks showed significant reduction in serum hs-CRP by probiotic VSL#3 treatment compared to placebo group. These Controversial observation may be attributed to factors such as strains of probiotic used in the study or dosage and duration of study.

The serum albumin level is a useful indicator of nutritional status. Malnutrition is characterized by a coffee albumin level. The decrease in serum albumin resulting from inflammatory cytokines is a most important issue among hospitalized patients. Hypoalbuminemia is the result of combined effects of inflammation and inadequate protein and caloric intake in patients with chronic disease. Inflammation and malnutrition both reduce albumin level by reducing rate of synthesis and inflammation alone is associated with a greater fractional catabolic rate. In the present study, symbiotic significantly decreased serum albumin. Some researchers showed that probiotics enhance nutritional status and systemic immune responses. Fukushima showed that administration of enteral nutrition with fermented milk containing of probiotic L. John sonii La1 for 12 weeks, increased in serum albumin and decreased in TNF- α compared to placebo in elders. In another study, Kaburagi et al. indicated that probiotic Lactobacillus John sonii La1 enhanced albumin concentrations and weight in aged mice with protein-energy malnutrition.

**Conclusion:** Results of study were showed that administration of symbiotic in critically ill patients reduced the amount of serum hs-CRP and increased the amount of albumin.

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