

# THE RELATIONSHIP BETWEEN THE OXIDIZED SERUM ALBUMIN AND HYPOALBUMINEMIA IN PERITONEAL DIALYSIS PATIENTS

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## Objectives

Oxidative stress produces molecular modifications of serum albumin that disturb its biological functions and interfere with its detection by the commonly used bromocresol green (BCG) assay. This study aimed to evaluate the relationship between the oxidized serum albumin (OSA) and hypoalbuminemia in peritoneal dialysis (PD) patients.

## Methods

24 PD patients with serum albumin levels measured by BCG assay (BCGSA)  $\leq 3.0$  g/dl enrolled in the study.

Serum albumin, OSA, oncotic pressure, hydration status, lean tissue index (LTI), normalized protein equivalent of total nitrogen appearance (nPNA) and hsCRP were determined.

OSA was assessed by a specific albumin detection index (ADI). ADI is defined as the ratio between the readout of the albumin-specific assay BCG to the total albumin concentration including the OSA fraction:  $[ADI = BCGSA / (OSA + BCGSA)]$ .

Participants were assigned to two groups according to their ADI ( $< 0.5$  or  $> 0.5$ ).

## Results

Both study groups were comparable in age, gender, presence of diabetes, BMI, PD modality, PD vintage, residual renal function (RRF), peritoneal membrane characteristics, Kt/v and serum albumin levels.

Mean ADI was  $0.43 \pm 0.01$  in patients with  $ADI < 0.50$  and  $0.62 \pm 0.03$  in patients with  $ADI \geq 0.50$  ( $p < 0.001$ ).

Extracellular/Intracellular water ratio (E/I ratio) was lower in patients with  $ADI < 0.5$  than in patients with  $ADI > 0.5$  ( $p = 0.002$ ).

Oncotic pressure and hsCRP were higher in patients with  $ADI < 0.5$  than in patients with  $ADI > 0.5$  ( $p = 0.024$ ,  $p = 0.032$ , respectively).

nPNA, RRF and LTI were similar in both groups.

Summary of the main results of the study

Variables	All patients	Patients with $ADI < 0.50$	Patients with $ADI \geq 0.50$	p
n	24	12	12	
Serum albumin (g/dl)	$2.59 \pm 0.36$	$2.52 \pm 0.09$	$2.67 \pm 0.11$	0.158
Albumin-detection index	$0.53 \pm 0.12$	$0.43 \pm 0.01$	$0.62 \pm 0.03$	$< 0.001$
nPNA (g/kg/day)	$0.80 \pm 0.18$	$0.78 \pm 0.04$	$0.85 \pm 0.05$	0.146
RRF (ml/min/1.73m <sup>2</sup> )	$5.28 \pm 1.01$	$5.39 \pm 0.25$	$5.18 \pm 0.32$	0.308
hsCRP (mg/dl)	$13.4 \pm 5.1$	$15.50 \pm 1.91$	$11.64 \pm 0.84$	0.032
Oncotic pressure (mmHg)	$22.16 \pm 3.04$	$23.48 \pm 0.76$	$21.05 \pm 0.86$	0.024
E/I ratio	$0.94 \pm 0.14$	$0.81 \pm 0.04$	$1.00 \pm 0.04$	0.002
LTI (kg/m <sup>2</sup> )	$13.6 \pm 1.9$	$14.1 \pm 0.32$	$13.2 \pm 0.14$	0.139

## Conclusions

- Although OSA may contribute to better oncotic pressure and hydration status, its pathogenic ability to initiate and accelerate the development of atherosclerosis should be kept in mind.
- Hypoalbuminemia in PD patients may be "true" or "apparent".
- "True" hypoalbuminemia includes the BCGSA and OSA fractions.
- "Apparent" hypoalbuminemia includes only the BCGSA.
- Without measuring the OSA fraction it is impossible to distinguish between "true" and "apparent" hypoalbuminemia.
- "Apparent" hypoalbuminemia may mislead medical staff decisions.

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