

# SERUM CERULOPLASMIN LEVEL AS A PREDICTOR FOR THE PERITONEAL DIALYSIS TECHNIQUE SURVIVAL

**Authors:** Natalia Stepanova, Lesya Korol, Olena Burdeyna, Mykola Kolesnyk

**Hospital:** State Institution «Institute of Nephrology of the National Academy of Medical Sciences», Kyiv, Ukraine

## OBJECTIVES

There are a limited number of studies devoted to the association between an antioxidant status and peritoneal dialysis (PD) adequacy and technical survival. The present study was undertaken to investigate some blood antioxidant biomarkers and their potential effects on PD technical survival.

## METHODS

This single-center, cross-sectional cohort study was conducted for between January 2010 and May 2015. Informed consent was obtained from all the subjects participating in the study.

44 (31 males, 13 females) stable ambulatory non-diabetic patients with ESRD on PD were included in the study. All the patients had been undergoing continuous ambulatory PD (CAPD) for more than 3 months. They were observed during a period of 36 months to determine the impact of antioxidant status on the dialysis technical survival.

The mean age in the patient population was  $48.9 \pm 13.2$  yrs. All the patients received commercially available, glucose-based Dianeal PD solution (Baxter Inc.) of various strengths (1.36 %, 2.27 %) and Icodextrin. All recruited PD patients received 4 exchanges daily. The diabetics and the patients with a history of peritonitis or significant illness / hospitalization in the previous 3 months were excluded. The average duration of PD therapy at this study entry (at baseline) was 29 [18.5-37] months.

Adequacy of dialysis and the concentration of ceruloplasmin (CP) in the blood were determined in the PD patients. The control group consisted of 30 healthy individuals.

Analysis and all graphs were performed using MedCalc (Belgium). Survival curves were constructed according to the Kaplan-Meier method and compared using the log-rank test. Technique survival times were censored when patients died, underwent transplantation, transferred to HD or were classified as “technique failures”. A technical failure was defined as all causes of discontinuation of PD. The durations of technique survival were calculated from the date of inclusion in the study. For this analysis, in January 2010, the patients were categorized into two groups according to the baseline CP level.

## RESULTS

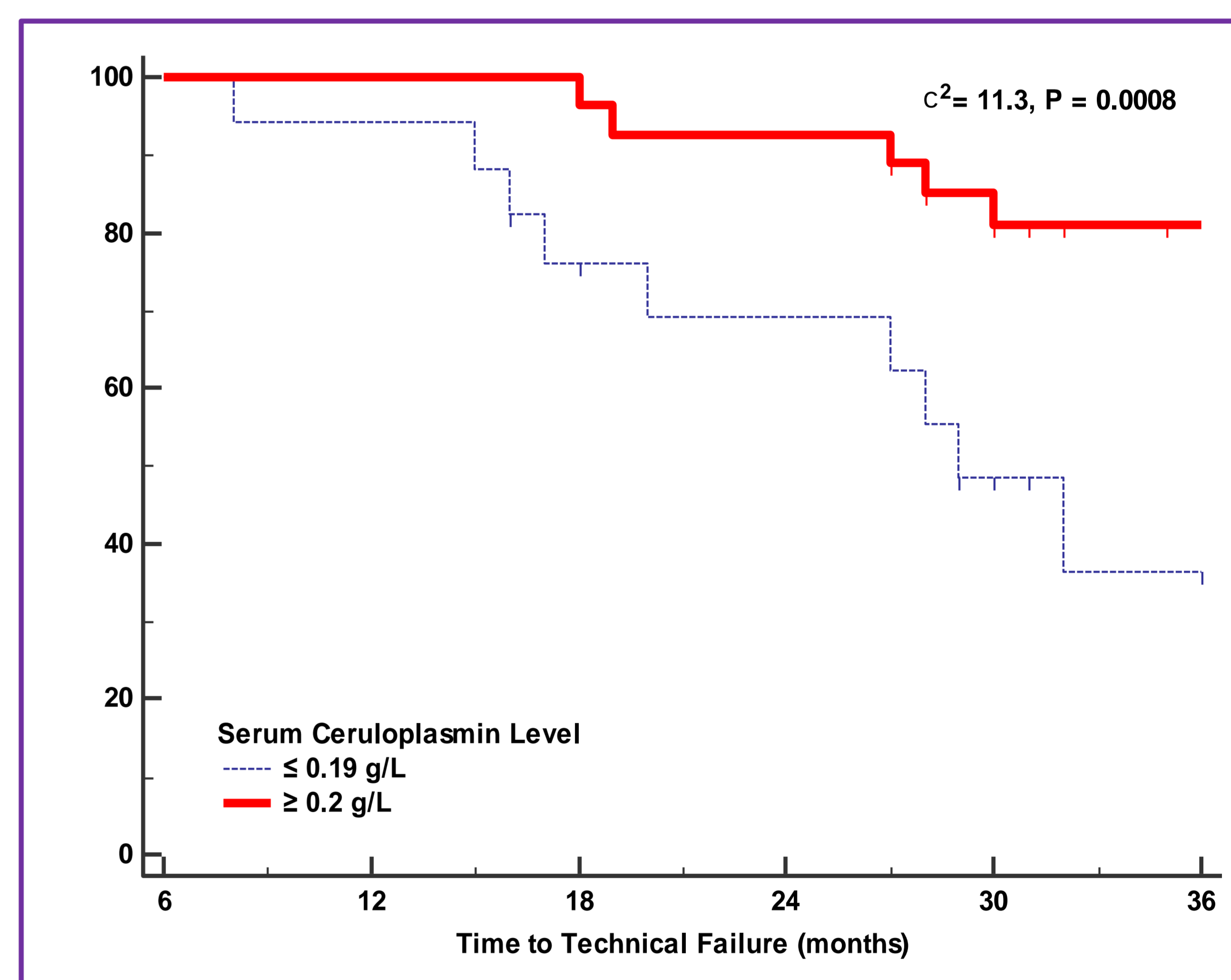
During the 3-yrs follow-up, 9 of 44 (20.5 %) patients dropped out from PD; 7 patients were considered to be ‘technique failures’, but, they continued PD treatment for various reasons: the inability to formation of an adequate vascular access 3 (6.8 %), the patient's refusal to transfer to hemodialysis 2 (4.5 %) and non-compliance 2 (4.5 %).

The baseline CP level in the PD patients was significantly decreased compared to the control group (0.09 [0.07 – 0.1] g/L vs 0.22 [0.19 - 0.23] g/L;  $P < 0.0001$ ). But, the average serum CP level in the 28 patients of the ‘technique survival’ group was significantly higher compared with the 16 patients of the ‘technique failure’ group (0.26 [0.22 - 0.32] g/L vs 0.09 [0.07 - 0.1] g/L,  $p < 0.0001$ ).

There were no significant differences in the demographic and baseline peritoneal dialysis characteristics of the patients in the two groups stratified according to CP levels, excluding PD technique survival ( $P = 0.001$ ).

The results of the Kaplan–Meier analysis and log-rank test also demonstrated that there was a significant difference in the cumulative technical survival rate between the patients with CP level  $\leq 0.19$  g/L and CP level  $\geq 0.2$  g/L (log-rank test:  $\chi^2 = 11.3$ ,  $P = 0.0008$ ).

The hazard ratio (HR) for the technique failures was significantly higher in the lowest CP tertile category compared with the highest CP level (HR, 4.8; 95% confidence interval, 1.2 to 18.7;  $P=0.002$ ).



Kaplan–Meier Technique Survival (Death Censored) Curves in PD-patients Dichotomized According to the Serum Ceruloplasmin Level in the 3-year Follow-up.

## CONCLUSIONS

We have found out a decrease in the serum ceruloplasmin level in the PD patients. Baseline serum ceruloplasmin level is an independent predictive factor for the PD technical survival. Further studies are needed to identify the opportunities for antioxidant therapy to improve the PD technique survival.

## REFERENCES:

1. S. Ignace, et al. Preserved residual renal function is associated with lower oxidative stress in peritoneal dialysis patients. *Nephrol. Dial. Transplant.* (2009) 24 (5): 1685-1689.
2. Boudouris G, Verginadis II, Simos YV, Zouridakis A, Ragos V, et al. Oxidative stress in patients treated with continuous ambulatory peritoneal dialysis (CAPD) and the significant role of vitamin C and E supplementation. *Int Urol Nephrol.* 2013 Aug;45(4):1137-44.