

ANTIOXIDATIVE EFFECTS OF PREDILUTION ON-LINE HAEMODIAFILTRATION

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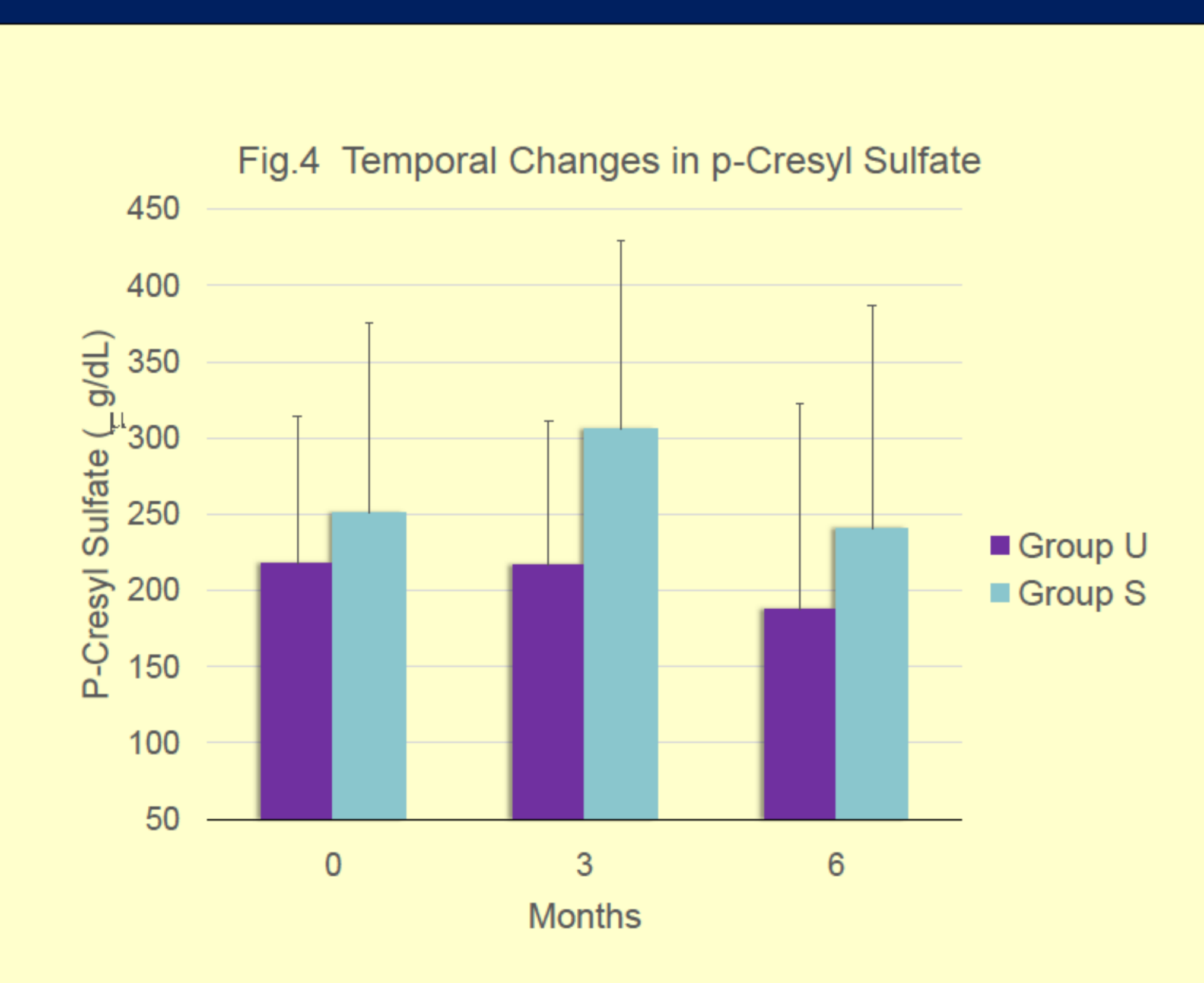
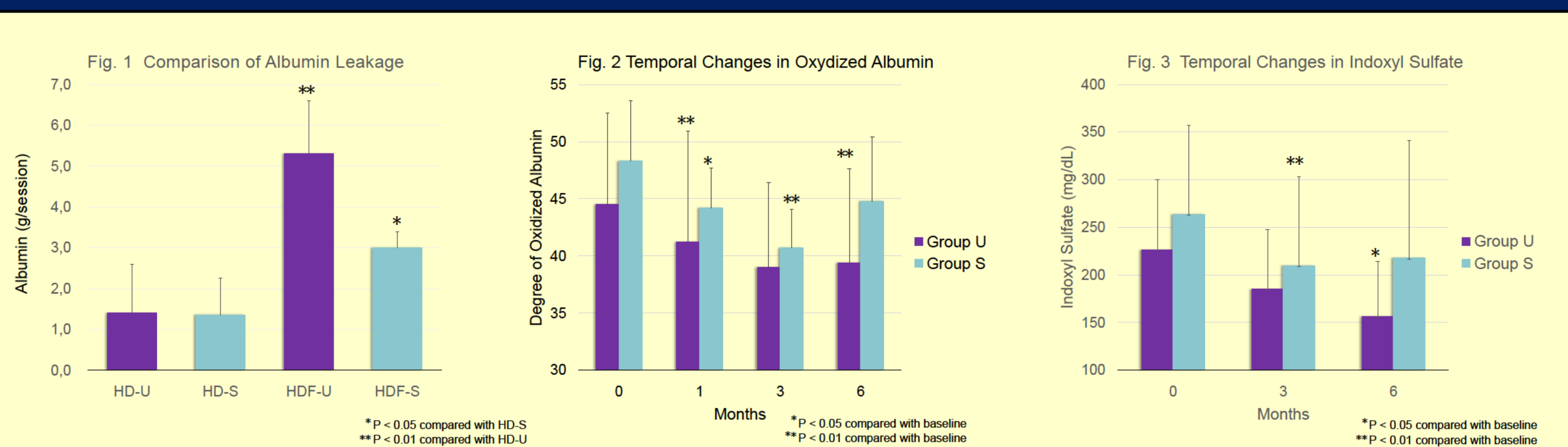
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Objectives:

There are increasing numbers of patients with end-stage renal disease treated on predilution OLHDF in Japan. Although suppressive effects of OLHDF on the production of inflammatory cytokines and hydroperoxide radicals have been reported, data supportive of the beneficial effects of predilution OLHDF are still limited. Therefore, in order to clarify its effects on oxidative stress, we measured oxidized albumin (OxAlb) levels in the present study.

Methods:

Twelve patients on maintenance haemodialysis (HD) were enrolled in this study. The treatment modality was switched to predilution OLHDF with two different haemodiafilters. In group U, haemodiafilter MFX-21Ueco (Nipro, Japan) with larger pores was used, while in group S, haemodiafilter MFX-21Seco (Nipro, Japan) with smaller pores was used. Group U consisted of 5 males and 1 female, with the average age of 56.0±20.0 years old, dialysis vintage of 70.6±48.6 months. Group S consisted of 5 males and 1 female, with the average age of 56.0±14.2 years old, dialysis vintage of 90.8±67.7 months. Blood samples were drawn before treatment sessions and temporal changes were studied. As a marker of oxidative stress, OxAlb (Cys34-cysteinylation of human serum albumin) was determined by electrospray ionization time-of-flight mass spectrometer¹. The degree of OxAlb is expressed as the ratio of OxAlb to the total albumin. Levels of indoxyl sulfate (IS) and p-cresyl sulfate (pCS) were determined by high performance liquid chromatography. Results are expressed as means±SD.



Results:

The albumin leakage increased from 1.4±1.2 (g/session) on HD to 5.3±1.3 on OLHDF in group U, 1.4±0.9 to 3.0±0.4 in group S (Fig.1). A significant decrease in the degree of OxAlb was observed at 3 and 6 months in group U, also at 1 and 3 months in group S (Fig. 2). Similarly, the levels of IS significantly decreased at 6 months in group U and at 3 months in group S (Fig. 3). The levels of pCS did not change significantly (Fig.4).

Conclusions:

Antioxidative effects of OLHDF demonstrated in the present study would lead to better outcomes for patients. There are three possible explanations for the decrease of the degree of OxAlb. Firstly, the increased albumin loss could enhance the turnover of albumin and result in lower degree of OxAlb. Second, IS is a protein-bound uremic toxin, which is related to oxidative stress. Therefore, increased removal of IS through OLHDF might reduce oxidative stress and the degree of OxAlb. Finally, reactive oxygen production caused by contact of the blood with the filter would decrease by dilution of the blood before the filter. Further studies are necessary to prove beneficial effects of predilution OLHDF on patient outcomes.

References:

1. Nagumo K, et al. Cys34-cysteinylation of human serum albumin is a sensitive plasma marker in oxidative stress-related chronic diseases. PLoS One. 2014 Jan 8;9(1):e85216. doi:10.1371/journal.pone.0085216. eCollection 2014.

